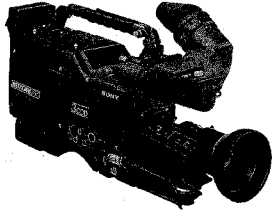
SONY

VTR IN CAMERA

BVW-400P



BETACAM SP

MAINTENANCE MANUAL
Volume 1 1st Edition
Serial No. 40001 and Higher

X-RAY RADIATION WARNING

Be sure that parts replacement in the high voltage block and adjustments made to the high voltage circuits are carried out precisely in accordance with the procedures given in this manual.

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SECTION 1
TECHNICAL INFORMATION

1-1. SPECIFICATIONS (for BVW-400 (UC))

(with standard playback machine)

(1) General

Power requirements
DC 12V (11V to 17V)
Battery pack NP-1A (Ni-Cd, 1.7Ah)
or NP-1 (Ni-Cd, 1.5Ah)
For AC operation: use optional AC-500 AC adaptor
Power consumption
22 W
(using a metal particle tape, 12V)
Operating temperature
0°C to +40°C
Operating humidity
Less than 85% (relative humidity)
Storage temperature
–20°C to +60°C
Weight Approx. 5.0 kg
Battery pack
NP-1A, NP-1: 0.7 kg
BP-90A, BP-90 : 1.7 kg
Dimensions
132 x 208 x 370 mm (w/h/d)
(Not incl. projecting parts and controls)
Video cassette
1/2 inch, cassette tape for Betacam format
Metal particle tape
BCT-5M/10M/20M/30M or equivalent
Oxide tape
BCT-5K/10K/20K/30K or equivalent

Tape speed
Approx. 118.6 mm/sec
Recording playback time
More than 30 minutes (with BCT-30M)
F.FWD time
Less than 9 minutes (with BCT-30M)
REW time
Less than 5 minutes (with BCT-30M)
Continuous Operating time
Approx. 50 minutes (with NP-1A)

(2) CONNECTOR

AUDIO IN CH-1/CH-2 (REAR)	XLR-3 pin (female)
GENLOCK VIDEO IN	BNC
TC IN	BNC
TC OUT	BNC
VIDEO OUT 1/2	BNC
EARPHONE OUT	Mini jack
PB ADAPTOR	20 pin
LENS	12 pin
REMOTE	6 pin
VF	20 pin
DC IN	XLR-4 pin
DC OUT 12V	4 pin
MIC IN (FRONT)	XLR-3 pin (female)

(3) CAMERA

CAMERA
Imager 2/3-inch frame interline-transfer, 3 chip
Imager configuration
RGB 3-CCDs
Spectral system
F1.4 prism system (with quartz filter)
Built-in filters
1:3200K
2:5600K + 1/4 ND
3:5600K
4:5600K + 1/16 ND
Lens mount
Special bayonet type
Video output
1.0 Vp-p, 75 ohms, unbalanced,
sync negative, two outputs
Sensitivity
2000 lux with F8 (typical),
89.9 % reflection
Minimum subject illumination
7.5 lux (F1.4 with + 18 dB gain setting)
Video signal-to-noise ratio
62 dB (typical)
Horizontal resolution
700 TV lines (at center)
Registration
0.05 % or less on entire screen
(without lens)
Geometric distortion
Not identified (without lens)

VIEWFINDER
Picture tube
1 1/2 inch monochrome, quick start type
with BRIGHT control, CONTRAST control,
PEAKING control, TALLY switch,
ZEBRA/MARKER switch, AUDIO/TAPE INDICATOR switch,
AUDIO LEVEL CH-1 control
Resolution
550 TV lines (at center)

(4) VTR

Video system
With a metal particle tape
Bandwidth
Luminance :
30 Hz to 4.5 MHz +0.5/–3.0 dB
Chrominance :
30 Hz to 1.5 MHz +0.5/–3.0 dB
S/N
Luminance :
More than 51 dB
AM :
More than 53 dB
PM
More than 53 dB
DG Less than 2 %
DP Less than 2
K-factor (2T pulse)
Less than 2 %
Y/C delay
Less than 20 nsec

With an oxide tape
Bandwidth
Luminance :
30 Hz to 4.1 MHz +0.5/–6.0 dB
Chrominance :
30 Hz to 1.5 MHz +0.5/–3.0 dB
S/N
Luminance :
More than 48 dB
AM :
More than 50 dB
PM :
More than 50 dB
DG Less than 3 %
DP Less than 3°
K-factor (2T pulse)
Less than 3 %
Y/C delay
Less than 20 nsec

Longitudinal (Audio channel 1, 2)
With a metal particle tape
Frequency response
50 Hz to 15 kHz +1.5/–3.0 dB
S/N More than 72 dB (3 % distortion)
Distortion (T.H.D)
Less than 1.5 % (1 kHz reference level)
Cross talk
Less than –55 dB (1 kHz reference level)
Wow and flutter
Less than 0.15 % rms

With an oxide tape
Frequency response
50 Hz to 15 kHz ± 3.0 dB
S/N(NR OFF)
More than 50 dB (3 % distortion)
(with DOLBY NR off)
Distortion (T.H.D)
Less than 2.0 % (1 kHz reference level)
Crosstalk
Less than –55 dB (1 kHz reference level)
Wow and flutter
Less than 0.15 % rms

AFM (Audio channel 1,2 recorded metal tape)
Frequency response
20 Hz to 20 kHz +0.5/–2.0 dB
Dynamic range
More than 80 dB (1 kHz reference level)
Distortion (T.H.D)
Less than 0.5 % (1 kHz reference level)
Crosstalk
Less than –65 dB (1 kHz reference level)

(5) Microphone

Gun-directional, for the phantom power supplied system

1-1. SPECIFICATIONS (for BVW-400P (EK))

(with standard playback machine)

(1) General

Power requirements
DC12V (11V to 17V)
Battery pack NP-1A (Ni-Cd, 1.7Ah)
or NP-1 (Ni-Cd, 1.5Ah)
For AC operation: use optional AC-500 CE
AC adaptor
Power consumption
22 W
(using a metal particle tape, 12V)
Operating temperature
0°C to +40°C
Operating humidity
Less than 85% (relative humidity)
Storage temperature
–20°C to +60°C
Weight Approx. 5.0 kg
Battery pack
NP-1A, NP-1 : 0.7 kg
BP-90A, BP-90 : 1.7 kg
Dimensions
132 x 208 x 370 mm (w/h/d)
(Not incl. projecting parts and controls)
Video cassette
1/2 inch, cassette tape for Betacam format
Metal particle tape
BCT-5M/10M/20M/30M or equivalent
Oxide tape
BCT-5K/10K/20K/30K or equivalent

Tape speed
Approx. 101.5 mm/sec
Recording playback time
More than 36 minutes (with BCT-30M)
F.FWD time
Less than 9 minutes (with BCT-30M)
REW time
Less than 5 minutes (with BCT-30M)
Continuous Operating time
Approx. 50 minutes (with NP-1A)

(2) CONNECTOR

AUDIO IN CH-1/CH-2 (REAR)	XLR-3 pin (female)
GENLOCK VIDEO IN	BNC
TC IN	BNC
TC OUT	BNC
VIDEO OUT 1/2	BNC
EARPHONE OUT	Mini jack
PB ADAPTOR	20 pin
LENS	12 pin
REMOTE	6 pin
VF	20 pin
DC IN	XLR-4 pin
DC OUT 12V	4 pin
MIC IN (FRONT)	XLR-3 pin (female)

(3) CAMERA

CAMERA
Imager 2/3-inch frame interline-transfer, 3 chip
Imager configuration
RGB 3-CCDs
Spectral system
F1.4 prism system (with quartz filter)
Built-in filters
1:3200K
2:5600K + 1/4 ND
3:5600K
4:5600K + 1/16 ND
Lens mount
Special bayonet type
Video output
1.0 Vp-p, 75 ohms, unbalanced,
sync negative, two outputs
Sensitivity
2000 lux with F8 (typical),
89.9 % reflection
Minimum subject illumination
7.5 lux (F1.4 with +18 dB gain setting)
Video signal-to-noise ratio
60 dB (typical)
Horizontal resolution
700 TV lines (at center)
Registration
0.05 % or less on entire screen
(without lens)
Geometric distortion
Not identified (without lens)

VIEWFINDER
Picture tube
1 1/2 inch monochrome, quick start type
with BRIGHT control, CONTRAST control,
PEAKING control, TALLY switch,
ZEBRA/MARKER switch, AUDIO/TAPE INDICATOR switch,
AUDIO LEVEL CH-1 control
Resolution
550 TV lines (at center)

(4) VTR

Video system
With a metal particle tape
Bandwidth
Luminance (50%) :
25 Hz to 5.5 MHz +0.5/-3.0 dB
Chrominance :
30 Hz to 1.5 MHz +0.5/-3.0 dB
S/N
Luminance* :
More than 48 dB
Color difference :
More than 48 dB
Low frequency non-Linearity
Less than 3 %
Pulse shape distortion (K-pulse 2T)
Less than 2 %
Y/C delay
Less than 20 nsec

With an oxide tape
Bandwidth
Luminance :
25 Hz to 4.0 MHz +0.5/-6.0 dB
Chrominance :
30 Hz to 1.5 MHz +0.5/-3.0 dB
S/N
Luminance* :
More than 46 dB
Color difference :
More than 45 dB
Low frequency non-Linearity
Less than 4%
Pulse shape distortion (K-pulse 2T)
Less than 3 %
Y/C delay
Less than 20 nsec

* The iuput/output levels of the component signals conform to the EBU "N-10" standard.

Audio system
Longitudinal (Audio channel 1, 2)
With a metal particle tape
Frequency response (20 dB below peak level)*1
50 Hz to 15 kHz +1.5/-3.0 dB
S/N*2 More than 62 dB
Distortion (at 1 kHz)
at peak level*1 Less than 3 %
at OVU level Less than 1.5 %
Cross talk (at 1 kHz)
Less than –55 dB
Wow and flutter (DIN 45507)
Less than 0.15 %
Depth of erasure (at 1 kHz)
More than 65 dB

With an oxide tape
Frequency response (20 dB below peak level)*1
50 Hz to 15 kHz ± 3.0 dB
S/N*2 More than 58 dB (with DOLBY NR on)
Distortion (at 1 kHz)
at peak level*1 Less than 3 %
at OVU level Less than 2 %
Cross talk (at 1 kHz)
Less than –55 dB
Wow and flutter (DIN 45507)
Less than 0.15 %
Depth of erasure (at 1 kHz)
More than 65 dB

AFM (Audio channel 1,2 recorded metal tape)
Frequency response (20 dB below peak level)*1
20 Hz to 20 kHz +0.5/-2.0 dB
S/N*2 More than 68 dB
Distortion (at 1 kHz)
at peak level*1 Less than 3 %
at OVU level Less than 0.6 %
Cross talk (at 1 kHz)
Less than –65 dB

*1) Peak level AFM: +19 VU, LNG: +8 VU
*2) Refered to peak level, weighted CCIR468-3, with Audio N.R.

(5) Microphone

Gun-directional, for the phantom power supplied system

1-2. INPUT/OUTPUT SIGNALS OF THE CONNECTORS

INPUT

AUDIO IN (REAR)	BVW-400 (UC): –60 dBu / +4 dBu (selectable) BVW-400P (EK): –60 dBs / +4 dBs (selectable) high impedance, balanced
GENLOCK VIDEO IN	1.0 Vp-p, 75 ohms
TC IN	0.5 to 18 Vp-p, 10 kohms
DC IN	11 to 17 V
MIC IN (FRONT)	BVW-400 (UC): –60 dBu (0 dBu = 0.775 Vrms) BVW-400P (EK): –60 dBs (0 dBs = 0.775 Vrms)

OUTPUT

VIDEO OUT	1.0 Vp-p, 75 ohms
TC OUT	1.0 Vp-p, 75 ohms
DC OUT	11 to 17 V

VF CONNECTOR (20P)

No.	SIGNAL	SPECIFICATION
1	VTR SAVE	SAVE: 0V, STBY: 4.5V
2	NC	———
3	NC	———
4	NC	———
5	MARKER $\overline{\text{ON}}$/OFF	ON: 0V, OFF: +4.6 V
6	CCIR/EIA	CCIR: +8.5 V, EIA: 0 V, Zo = 1 kΩ
7	AUDIO IND ON/OFF	ON: +4.6 V or OPEN, OFF: 0 V, Zo = 1.5 kΩ
8	VF VIDEO (G)	GND
9	NC	———
10	NC	———
11	ZEBRA ON/OFF	ON: 0 V, OFF: OPEN or +9.3 V
12	VF VIDEO (X)	Zo ≦ 100Ω 1 Vp-p
13	AU LEVEL CONT	0 V (0 dB) to +7 V (–20 dB)
14	NC	———
15	NC	———
16	H:BATT IND	ON: +5 V, OFF: 0 V or OPEN
17	REC/ALARM	ON: +9 V, OFF: 0 V or OPEN
18	+9.3 V (VF)	+9.3 V
19	UNREG GND	GND
20	UNREG +12V	+11 V to +17 V

REMOTE CONNECTOR (6P)

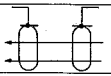
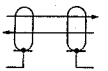
No.	SIGNAL	SPECIFICATION
1	L:VTR START/STOP	TRIG: 5 Vp-p
2	CAMERA SD	SERIAL DATA +4.6 V / 0 V
3	UNREG GND	GND
4	NC	———
5	REC ALARM	ON: +9 V, OFF: 0 V or OPEN
6	UNREG +12 V	+11 V to +17 V

CCZ CONNECTOR (26P)

Fit the VTR connector unit BKW-402 which is separately available in the market to the main unit and connect with BVW-35/35P/25/25P, VA-5/5P and BVV-5/5PS by CCZ cable.

No.	SIGNAL	BVW-400/400P	DIRECTION	EXT VTR SIDE
1	VBS OUT (X)	Zo = 75Ω 1Vp-p±1dB DC = 0±100mV		Zi = 75Ω
2	VBS OUT (G)			
3	Y VIDEO OUT(G)	Zo = 75Ω 1Vp-p±0.5dB DC = 0±200mV		Zi = 75Ω
4	Y VIDEO OUT(X)			
5	R-Y VIDEO OUT(X)	Zo = 75Ω 700mVp-p (NTSC) 525mVp-p (PAL) EBU NIO LEVEL (75% color bars)		Zi = 75Ω
6	R-Y VIDEO OUT(G)			
7	B-Y (X)	Zo = 75Ω 700mVp-p (NTSC) 525mVp-p (PAL) EBU NIO LEVEL (75% color bars)		Zi = 75Ω
8	B-Y (G)			
9	AUDIO CH1 (X)	−60dBm Zo≦600Ω (BALANCED)		Zi = 3KΩ ~ 10KΩ (BALANCED)
10	AUDIO CH1 (Y)			
11	AUDIO CH1 (Z)			
12	VTR START/$\overline{\text{STOP}}$	START : 4.5±0.5Vdc STOP : 0±0.5Vdc Zo≦10KΩ		START: 5^{+9}_{-1} V STOP: $0^{+0.3}_{-0}$ V or OPEN
13	NC	———		
14	NC	———		———
15	REC ALARM IN	Zi≧20KΩ		
16	NC	———		———
17	SHIELD	———		GND
18	RET VIDEO IN (X)	Zi = 75Ω		Zo = 75Ω 1Vp-p ±1dB DC = 0±200mV
19	RET VIDEO IN (G)			
20	VTR SAVE	SAVE : 4.5 ±0.5V STBY: $9^{+1}_{-0.5}$ V Zo≦10KΩ		
21	NC	———		———
22	COLOR FRAMING	5± 1V		Zi≧100KΩ
23	NC	———		———
24	NC	———		———
A	POWER SENSE IN			min. 11V (3A) Max. 17V
B	UNREG GND			

PB ADAPTOR CONNECTOR (20P)

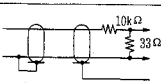
No.	SIGNAL	VTR	DIRECTION	PB ADAPTOR
1	Y-RF (X)	75 Ω (OXIDE=0.1 Vp-p) METAL=0.2 Vp-p (Center Carrier)		Z = 75Ω
2	Y-RF (G)			
20	C-RF (X)	75 Ω (OXIDE=0.1 Vp-p) METAL=0.2 Vp-p (Center Carrier)		Z = 75Ω
19	C-RF (G)			
3	AUDIO CH1 (X)	LOW Impedance −10 dBu		Z = 10 kΩ
5	AUDIO CH2 (X)			
4	AUDIO (G)			
16	Y SW PULSE (X)	1,3 CH : H 2,4 CH : L OPEN COLLECTOR		Z = 10 kΩ , Pull up +5 V
18	ADVANCE SYNC (X)	Z = 75Ω		2 ± 0.5 Vp-p, 75Ω
15	ADVANCE SYNC (G)			
6	CONTROL SIG. 1	METAL "H" FF/REW "M" OXIDE "L" H = 5.0 V M = 2.5 V L = 0 V	———	High impedance
17	CONTROL SIG. 2	PLAY : HIGH (> 6.5 V) Z = 10 kΩ	———	Z = 57 kΩ
9	VIDEO (X)			Z = 75Ω 1 Vp-p
10	VIDEO (G)			
7	GND		———	
8	GND		———	
13	+12 V		———	
14	+12 V		———	
12	C SW PULSE (X)	1,3 CH : L 2,4 CH : H (0.3V)		Z = 75Ω
11	C SW PULSE (G)	EMITTER FOLLOWER (OPEN)		

LENS CONNECTOR (12P)

No.	SIGNAL	SPECIFICATION
1	L:PB CONT	ENABLE: 0 V, DISABLE: +5 V or OPEN
2	L:VTR START/STOP	TRIG: 0 V⎍5 Vp-p
3	UNREG GND	GND
4	AUTO +5V	AUTO: +5 V, MANU:0 V or OPEN
5	IRIS CONT	+3.4 V (F16) to +6.2 V (F2.8)
6	UNREG +12V	+11 V to +17 V
7	IRIS POS	+3.4 V (F16) to +6.2 V (F2.8)
8	REMOTE/LOCAL	REMOTE MODE: +4.6 V, LOCAL MODE: 0 V
9	EXTENDER ON/OFF	ON:0 V, OFF: +4.6 V or OPEN
10	NC	
11	NC	
12	NC	

PB ADAPTOR CONNECTOR (20P)

• When the unit is connected with the BVW-35/35P/25/25P by the optional connection cable

No.	SIGNAL	REMARKS FOR SIGNAL	DIRECTION	BVW-35/25 26 PIN No.
1	W35 REC / ALARM IN	0V, +2.5V, +5Vdc	←	15
20	W35 START / STOP	START: 4.5 Vdc STOP: 0Vdc	→	12
3	AUDIO CH1 (X) OUT	Output -10dBu		9
4	AUDIO CH1 (G) OUT			10 11
18	RETURN VIDEO (X) IN	1.0Vp-p, 75Ω		18
15	RETURN VIDEO (G) IN			19
9	VIDEO OUT (X)	1.0Vp-p, 75Ω		1
10	VIDEO OUT (G)			2
7	GND			B
8	GND			
12	INTERFACE SENCE	UNREG +12V IN		A

1-3. CONNECTION CONNECTOR

When external cables are connected to the various connectors on the connector panel during maintenance, the hardware listed below (or equivalents) must be used.

Panel Indication	Connection connector
AUDIO IN	1-508-084-00 CONNECTOR, XLR, 3P, MALE
DC IN	1-508-362-00 PLUG, XLR, 4P, FEMALE
TC IN/OUT	1-560-069-11 PLUG, BNC, MALE
GENLOCK VIDEO IN	1-560-069-11 PLUG, BNC, MALE
VIDEO OUT	1-560-069-11 PLUG, BNC, MALE
PB ADAPTOR	1-566-771-11 PLUG, 20P MALE
MIC IN	1-508-084-00 CONNECTOR, XLR, 3P MALE
REMOTE	1-560-078-00 CONNECTOR, 6P, MALE
DC OUT	1-565-654-11 CONNECTOR, ROUND TYPE 4P
EXT VTR (OPTION: BKW-402)	1-564-184-21 PLUG, CONNECTOR (SOCKET) 26P, FEMALE

1-4. SETTING OF THE SYSTEM SELECT CIRCUIT

Along with the select switches and controls on the side panel, some internal system select circuits are on the circuit boards.

• TC-48A/P Board

(1) SL7
Set the condition to TC generator is put into the power save mode.
When the battery is disconnected, TC generator is put into the power save mode: SL7 is opened.
When the POWER switch is turned OFF, TC generator is put into the power save mode: SL7 is shorted.
When the unit is shipped, SL7 is opened.

(2) SL8
Selects whether the color frame flag should be set or not, when the color frame flag is locked.
Set the color frame flag : SL8 is opened.
Does not set the color frame flag : SL8 is shorted.
When the unit is shipped, SL8 is opened.

(3) SL10, SL11
Selects the power supply while TC is power save mode.
UNSW +12V : SL10 is shorted, SL11 is opened,
(TC generator : ON)
UNREG +12V : SL10 is opened, SL11 is shorted.
(TC generator : OFF)
When the unit is shipped, SL10 is shorted.

(4) S517 SLAVE U-BIT INT/EXT SW
Selects whether the U-bit is slaved by internal or external, when locking the slave.
When the unit is shipped, this switch is set to the INT position.

(5) S518 REAL TIME VITC/LTC SW
Selects whether the real time is recorded on the VITC or the LTC.
When the unit is shipped, this switch is set to the VITC position.

(6) S103, S203 LIMITER ON/OFF SW
When turned OFF, audio level limiter is released.
S103: CH-1
S203: CH-2
When the unit is shipped, these switches are set to the ON posiotion.

• SY-117C/P Board

(1) S1 SLACK MUTE SW
When turned ON, detection of the slack is muted. Normally set to the OFF position.
When the unit is shipped, this switch is set of the OFF position.

- **VA-104 Board**

(1) S1 GAIN SELECT SW
By setting the GAIN selector (side panel) to "18", the video output level can be raised by 18 dB or 24 dB with this switch. (Refer to Sec. 1-5.)
In case of changed this switch, be sure to perform the +18 dB Black Set Adjustment for R, G and B video signals respectively.
When the unit is shipped, this switch is set to the 18 dB position.

(2) [R] OFFSET ADJ (S2)
Adjusts the resolution. See SECTION 4 ADJUSTMENT REQUIREMENTS for more information.

- **IE-30/P Board**

(1) S1 DTL ON/OFF SW
Selects whether the detail signal which generated from the IE-30/P board for resolution improvement should be added to the video signal or not.
Turn ON this switch : add the detail signal.
When the unit is shipped, this switch is set to the ON position.

- ***IE-31 Board**

(1) APERTURE ON/OFF (S2)
This switch is used to turn ON or OFF the operture circuit. The circuit does not work with this switch set to OFF.
The switch is factory-set to ON.

- **PR-132A/U Board**

(1) S1, S2, S3 R r, G r, B r
When turned ON, the gamma correction is performed so that the overall characteristic of signals between camera and monitor is "r=1". Normally set to the ON positions.
When the unit is shipped, these switches are set to the ON position.

(2) S5 WHITE CLIP & KNEE ON/OFF SW
When turned OFF, the white clipping and knee correction are automatically released. This switch is used for the video circuit adjustment. Normally set to the ON positions.
When the unit is shipped, these switches are set to the ON position.

(3) S4 MASK ON/OFF SW
When turned ON, LINEAR MATRIX MASKING is turned ON and obtain the high saturated color appearance.
If need require, set to the ON position.
When the unit is shipped, this switch is set to the OFF position for UC model, on the other hand, set to the ON position for EK model.

- **EN-79U/P Board**

(1) S1, S2 R-Y ON/OFF, B-Y ON/OFF SW
When turned ON, the R-Y and/or B-Y signal is added to the each encoder circuit. These switches are used for the encoder circuit adjustment. Normally set to the ON positions.
When the unit is shipped, these switches are set to the ON positions.

(2) S3 Y/G SELECT SW
When set to the G position, all the Y signal is changed to G signal.
And at same time, "MONITOR MODE" is displayed on the Viewfinder.
This switch is used for the camera block adjustment. Normally set to the ENC position.
When the unit is shipped, this switch is set to the ENC position.

- **SG-152/AP Board, SG-157/P Board**

(1) S1 V BLKG SELECT SW (UC only)
Adjusts the vertical blanking width.
When the unit is shipped, this switch is set to "20H"

(2) S2 H BLKG SELECT SW
Adjusts the horizontal blanking width.
When the unit is shipped, this switch is set to be these levels:

UC	10.9 ± 0.2μs
EK	12.0 ± 0.2μs

(3) S3 TEST SAW SW
When turned ON, the lens is forcibly closed and the TEST SAW waveform is added to the video signal circuit.
This switch is used for the video circuit adjustment. Normally set to the OFF position.
When the unit is shipped, this switch is set to the OFF position.

* Serial No. 10011 and higer (UC)
40001 and higer (EK)

(4) EXT SC 0/180 (S4/SG-157/P)
This switch turns SC (subcarrier) phase of the output signal in GENLOCK mode, If adjustment is not completed by EXT SC VR, set this switch to the opposite position to setting position.
When the unit is shipped, this switch is set to the 0 position.

• AT-49A Board

(1) CHECK, FP INH SW (S1)

CHECK (S1-2)
When turned ON, the diagnostic for the camera circuit can be performed.
Normally set to the OFF position.
When the unit is shipped, this switch is set to the OFF position.

FP INH (S1-1)
When set to the OFF (OPEN) position, the white balance compensation values for each filter can be stored in the memory A and memory B independently. Then 8 adjusted values; 4 for the memory A and 4 for the memory B can be stored. When set to the ON position, only 2 compensation values; one for memory A and one for memory B can be stored. In this case, the compensation values will not correspond to the selection of the color temperature conversion filter. According to the selection of WHITE BAL switch (on the side panel), the white balance compensation values are stored and read out from the memory A and memory B.
When the unit is shipped, this switch is set to the OFF position.

(2) MEMORY RESET SW (S2)
Use for the compensation data stored in the microcomputer can be reset. When set to the RESET position, indicates "MEMORY RESET" in the Viewfinder and resets the compensation data.
After confirm this indication, set this switch to the OPERATE position.
When the unit is shipped, this switch is set to the OPERATE position.

• IF-298 Board

(1) VTR MODE (EXT ONLY/PARALLEL) (S1)
This switch is effective when the external VTR is connected with BKW-402 (option) or S2 is set to ON.
When you select PARALLEL, both built-in VTR of the BVW-400/400P and external VTR connected through the BKW-402 operate and enable simultaneous recording.
If you select EXT ONLY, only the external VTR operates.
Normally, This switch is set to PARALLEL.

(2) 26P INTERFACE (S2)
Normally, the interface circuit operates automatically when an external VTR is connected through the 26-pin connector; the circuit does not operate if the external VTR is not connected (The power saving circuit of IF board will activate). If this switch is set to ON, however, the interface circuit operates and a signal is output from 26-pin connector even when the external VTR is not connected.
Normally, this switch is set to OFF.

(3) CENTER MARKER ON/OFF (S3)
When this switch is set to ON, you can use the viewfinder MARKER switch to display the CENTER MARKER on the viewfinder.
Normally, this switch is set to ON.

(4) SAFETY ZONE ON/OFF (S4)
When this switch is set to ON, you can use the viewfinder MARKER switch to display the SAFETY ZONE on the viewfinder.
Normally, this switch is set to ON.

(5) SAFETY ZONE 80/90% (S5)
Selects the range of the SAFETY ZONE to either 80% or 90% when S4 (SAFETY ZONE) is set to ON.
Normally, this switch is set to 80%.

(6) EXT VTR INDEPENDENT ON/OFF (S6)
Usually, the external VTR is controlled by the VTR START/STOP switch of the BVW-400P. When this switch is set to ON, the external VTR can be controlled independently by itself. Normally, this switch is set to OFF.

(7) MARKER ON (S7)
Unlike regular viewfinders, the 3" or 5" viewfinder does not have the marker ON/OFF switch on the viewfinder. Set the MARKER ON to ON to have the marker appear in the viewfinder when the 3" or 5" viewfinder is used.

(8) N/P (S8)
The mode of the marker generator can be set either to NTSC or PAL.

- **SW-260A Board**

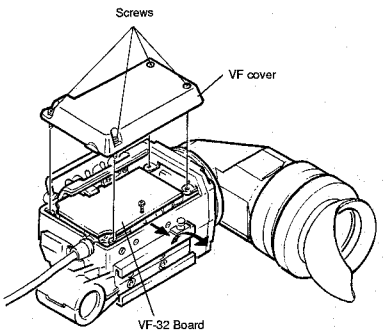
(1) SL1, SL2

By shorting SL1 or SL2, two indications ZEBRA and CENTER MARKER can be displayed at the same time on the viewfinder screen.

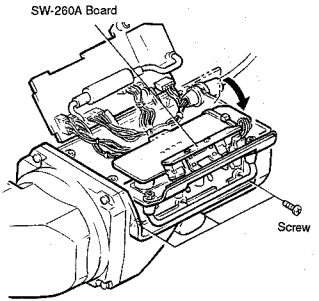
ZEBRA/MARKER SW	NORMAL	SL1 SHORT	SL2 SHORT
ZEBRA ON	ZEBRA	ZEBRA	ZEBRA + MARKER
OFF	OFF	OFF	OFF
MARKER ON	MARKER	MARKER + ZEBRA	MARKER

- **Modification procedure**

1. Loosen four screws and remove the VF cover.
2. Remove the screw securing the VF-32 board and open the VF-32 board in the direction of arrow.



3. Remove three screws securing the switch panel and open the panel.
4. Solder and short SL1 or SL2 on the SW-260A board.



1-5. GAIN CHANGES

The gains of 0-9-18 dB can be selected with the GAIN selector (on the side panel). But the video output level can be raised by 24 dB at the 18 dB position of GAIN selector.
Therefore the following two types gain can be set.

0-9-18 dB
and
0-9-24 dB

- **Changing from 18 dB into 24 dB**

By setting the S1 (GAIN SELECT SW) on the VA-104 board to the 24 dB position, the video output level can be raised by 24 dB at the 18 dB position of GAIN selector (on the side panel).
When this switch is changed; 18 dB to 24 dB or 24 dB to 18 dB, be sure to perform the +18 dB Black Set Adjustment. (Refer to Sec. 7-4-10)

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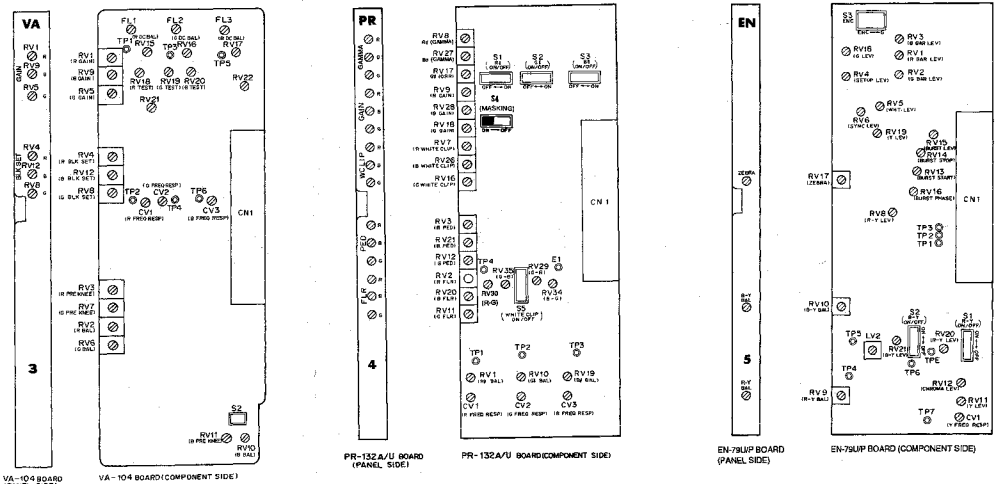
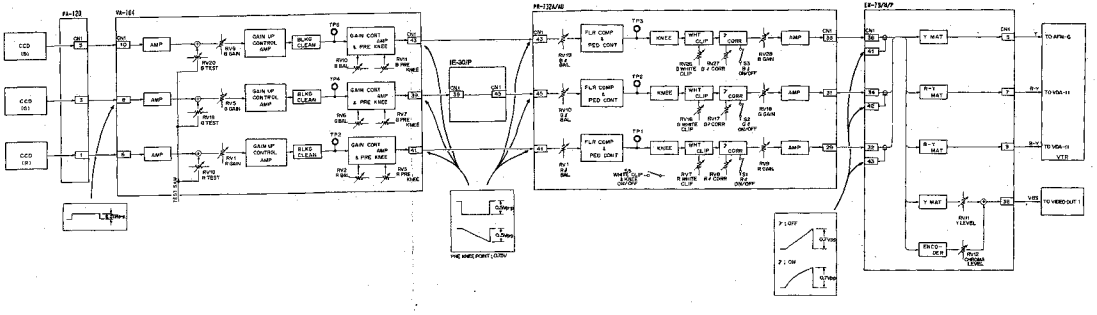
1-6. LEVEL CHECK SHEET

1. Adjust the iris control so that the video level at CN1-8/VA-104 board is 0.275 ± 0.01 Vp-p.
2. Adjust the RV5(G GAIN)/VA-104 board so that the video level at CN1-45/PR-132A/U board is 0.5 ± 0.01 Vp-p.
3. Adjust the RV1 (R GAIN)/VA-104 board so that the video level at CN1-41/PR-132A/U board is 0.5 ± 0.01 Vp-p.
4. Adjust the RV9 (B GAIN)/VA-104 board so that the video level at CN1-43/PR-132A/U board is 0.5 ± 0.01 Vp-p.
5. Set the S3 (TEST SAW)/SG-152/P board to the ON position.
6. Adjust the RV19 (G TEST)/VA-104 board so that the video level at CN1-45/PR-132A/U board is 0.5 ± 0.01 Vp-p.
7. Adjust the RV18 (R TEST)/VA-104 board so that the video level at CN1-41/PR-132A/U board is 0.5 ± 0.01 Vp-p.
8. Adjust the RV20 (B TEST)/VA-104 board so that the video level at CN1-43/PR-132A/U board is 0.5 ± 0.01 Vp-p.
9. Adjust the RV10 (Gr BAL)/PR-132A/U board so that the no video level difference at CN1-31/PR-132A/U board while setting S2 (Gr ON/OFF)/PR-132A/U board to ON or OFF.
10. Adjust the RV1 (Rr BAL)/PR-132A/U board so that the no video level difference at CN1-29/PR-132A/U board while setting S1 (Rr ON/OFF) to ON or OFF.
11. Adjust the RV19 (Br BAL)/PR-132A/U board so that the no video level difference at CN1-33/PR-132A/U board while setting S3 (Br ON/OFF) to ON or OFF.
12. Adjust the RV18 (G GAIN)/PR-132A/U board so that the video level at CN1-42/EN-79U/P board is 0.7 ± 0.01 Vp-p.
13. Adjust the RV9 (R GAIN)/PR-132A/U board so that the video level at CN1-43/EN-79U/P board is 0.7 ± 0.01 Vp-p.
14. Adjust the RV28 (B GAIN)/PR-132A/U board so that the video level at CN1-41/EN-79U/P board is 0.7 ± 0.01 Vp-p.





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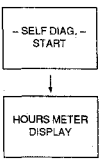
1-7. DIAGNOSTIC MODE

BVW-400/400P is provided with a diagnostic function. This function displays on the viewfinder and the LCD display on the side panel.

The LCD display also displays the hours meter, and more, battery before end voltage adjustment can also perform on this LCD display.

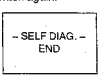
1-7-1. Operation

1. Put the unit into STOP mode.
2. Press the DIAGNOSTIC switch on the side panel with a pencil lead or similar object and put into DIAGNOSTIC mode.
   Display on the monitor as follows.



(MODE "0", Hours meter is displayed on the LCD display.)

3. Press the ADVANCE button on the side panel, and shift the mode step by step.
4. Press the SHIFT button and perform the mode.
5. When this DIAGNOSTIC mode is ended, press the DIAGNOSTIC switch again.



1-7-2. Mode Table

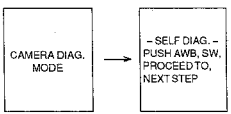
MODE	ITEM/CONTENTS
0	HOURS METER • DRUM RUNNING METER • TAPE RUNNING METER • OPERATION METER It is recommended to perform the periodic checks and maintenance based on the hours meter. (Refer to Sec. 2-2)
1	Display and setting of battery before end voltage Display the voltage of battery before end and can be changed. (Refer to Sec. 1-14)
2	LCD display check Check that LCD display's 7 segments are all turned on or off, all lights is put out or not by pressing the SHIFT button.
3	EEPROM check Check that EEPROM on the TC-48A/P board is activated normally, and TC-48A/P circuit is operated normally. Press the SHIFT button and displayed on the LCD display as follows. • EEPROM : OK 3-0 • EEPROM : NG 3-E When EEPROM is not activated normally, check the TC-48A/P circuit or replace the EEPROM.
4	Diagnostic of CAMERA system • Switch interface check • AUTO circuit check
5	Diagnostic of VTR system (1) • Function key interface check • Function lamp check
6	Diagnostic of VTR system (2) • Photo interruptor check

MODE	ITEM/CONTENTS
7	Diagnostic of VTR system (3) • Photo interruptor check • Tape beginning sensor check • Tape end sensor check
8	Diagnostic of VTR system (4) • Drum rotation check • Capstan rotation check • Reel FG (take-up side) check • Reel FG (supply side) check

1-7-3. Self Diagnostic Function

(1) Camera system

1. Press the ADVANCE button so that the MODE "4" is displayed. Then press the SHIFT button.



(NOTE) Self diagnostic function of camera system independently can be perfomed as the following procedures in the normal operation.
Set the internal switch as follows.

S1-2 (CHECK) on the AT-49A board : ON

Set this switch to the OFF position, the unit returns to the normal operation.

2. Set the AUTO W/B BAL switch to "WHT", the unit advances to next step.
3. When "NG" is indicated, check a related circuit.

STEP	Setting	LCD display	VF screen	Related circuit
		4	– SELF DIAG. – PUSH AWB. SW. PROCEED TO. NEXT STEP	
1	S3 (TEST SAW)/ SG-152/AP board: ON or Shoot a suitable object.	4	– SELF DIAG. – STEP 1 R. GAIN: OK PUSH AWB. SW. ↓ – SELF DIAG. – STEP 1 B. GAIN: OK PUSH AWB. SW.	• AT-49A board IC9→RB3→IC10(2/2)→IC12→CN1-22 IC2→IC3→IC1→IC6→IC7 • VA-104 board CN1-30→IC3 • AT-49A board IC9→RB3→IC10(2/2)→IC12→CN1-23 IC2→IC3→IC1→IC6→IC7 • VA-104 board CN1-31→IC9
2	Close the lens iris. When the lens is not closed, the following message is displayed until it is closed. STEP 2: LENS: NOT CLOSED	4	– SELF DIAG. – STEP 2 G. BLACK : OK PUSH AWB. SW. ↓ – SELF DIAG. – STEP 2 R. BLACK : OK PUSH AWB. SW. ↓ – SELF DIAG. – STEP 2 B. BLACK : OK PUSH AWB. SW.	• AT-49A board IC9→RB3→IC10(2/2)→IC12→CN1-25 IC2→IC3→IC1→IC6→IC7 • VA-104 board CN1-33→IC15-52→IC15-53 • AT-49A board IC9→RB3→IC10(2/2)→IC12→CN1-24 IC2→IC3→IC1→IC6→IC7 • VA-104 board CN1-32→IC15-46→IC15-47 • AT-49A board IC9→RB3→IC10(2/2)→IC12→CN1-26 IC2→IC3→IC1→IC6→IC7 • VA-104 board CN1-34→IC15-50→IC15-51

STEP	Setting	LCD display	VF screen	Related circuit
3	Close the lens iris. When the lens is not closed, the following message is displayed until it is closed. STEP 3: LENS: NOT CLOSED	4	– SELF DIAG. – STEP 3 R. PED : OK PUSH AWB. SW. ↓ – SELF DIAG. – STEP 3 B. PED : OK PUSH AWB. SW.	• AT-49A board IC9→RB3→IC10(2/2)→IC12→CN1-35 IC2→IC3→IC1→IC6→IC7 • PR-132A/U board CN1-37→IC2 • AT-49A board IC9→RB3→IC10(2/2)→IC12→CN1-36 IC2→IC3→IC1→IC6→IC7 • PR-132A/U board CN1-38→IC11
4	GAIN selector: 0 OUTPUT/DCC selector: DCC OFF WHITE BAL selector: A S3(TEST SAW)/ SG-152 board: OFF	4	– SELF DIAG. – STEP 4 AUTO IND OK? PUSH AWB. SW.	
5	GAIN Selector (on the side panel) : 18	4	– SELF DIAG. – STEP 5 SET 18 DB : OK PUSH AWB. SW.	• SW-220 board S2 • MB-317/P board CN54-A3 → • AT-49A board CN1-28 → • IE-30/P board CN1-34 → • VA-104 board CN1-35
	GAIN Selector (on the side panel) : 9	4	– SELF DIAG. – STEP 5 SET 9 DB : OK PUSH AWB. SW.	• SW-220 board S2 • MB-317/P board CN54-B3 → • AT-49A board CN1-29 → • IE-30 board CN1-35 → • VA-104 board CN1-36

STEP	Setting	LCD display	VF screen	Related circuit
5	OUTPUT/DCC selector (on the side panel) : BARS/OFF	4	– SELF DIAG. – STEP 5 SET BARS: OK PUSH AWB. SW.	• SW-220 board S3 • MB-317/P board CN54-B5 • AT-49A board CN1-43 • EN-79U/P board CN1-45 • SG-152/AP board CN1-37
	S3 (TEST SAW)/ SG-130 board: ON	4	– SELF DIAG. – STEP 5 SET TEST : OK PUSH AWB. SW.	• SG-152/APboard S3→CN1-12 • AT-49A board CN1-47 • VA-104 board CN1-24 • DR-124 board CN1-5
	OUTPUT/DCC selector (on the side panel) : CAM/ON	4	– SELF DIAG. – STEP 5 SET DCC : OK PUSH AWB. SW.	• SW-220 board S3 • MB-317/P board CN54-A5 • AT-49A board CN1-33 • PR-132A/U board CN1-35
	WHITE BAL selector (on the side panel) : B	4	– SELF DIAG. – STEP 5 SET A/B : OK PUSH AWB. SW.	• SW-220 board S4 • MB-317/P board CN54-A4 • AT-49A board CN1-30
	WHITE BAL selector (on the side panel) : PRST	4	– SELF DIAG. – STEP 5 SET W. PST : OK PUSH AWB. SW.	• SW-220 board S4 • MB-317/P board CN54-B4 • AT-49A board CN1-31

(2) VTR system

If a result of the diagnostic is different from one in the following table, check the circuit as the following procedure.

1. Install the EX-148 extension board in place of the SY-117C/P board. (Never connect the SY-117C/P board.)
2. Short between TP5/EX-148 board and TP1(GND)/EX-148 board with a shorting clip.
3. Check whether the signal described in the following table is appeared or not at TP6 and TP7 by shorting between TP8, TP9, TP10 and TP1(GND).
   TP6: IC202-14/MB-317/P
   TP7: IC201-14/MB-317/P

○: Short to TP1

TP8	TP9	TP10	TP6	MODE	TP7	MODE
○	○	○	METAL / OXIDE	7	H: CASSE IN	6
○	○		H: OX REC OK	7	H: METAL REC OK	7
○		○	L: RETURN KEY	5	L: CASSE LOCK	6
○			(VTR STBY / SAVE SW)		(L: TC READY)	
	○	○	(H: RF ALARM)		(L: CAM READY)	
	○		L: EJECT KEY	5	(L: SV READY)	
		○	L: FF KEY	5	L: STOP KEY	5
			L: REW KEY	5	L: PLAY KEY	5

4. When the signal is appeared as described in the above table, the SY-117C/P board has a trouble.

   When the signal is not appeared as described in the table, check a related circuite as following procedure.
   (1) Remove the all plug in printed circuit boards including the CD-89 board.
   Then install the EX-148 extension board in the position of the SY-117C/P board.
   (2) Short between TP5/EX-148 board and TP1(GND)/EX-148 board, TP50(+5V)/EX-148 board and TP508/TC-48A/P board with shorting clips. Make sure that the SL10/TC-48A/P board is shorted, SL11 is opened.
   (3) Install the Battery or use the AC adaptor. Turn OFF the POWER switch.
   (4) Check a related circuit.
   (NOTE) • Within a few seconds, check a relate circuit.
   • After the check is completed, remove the shorting clips rapidly.

The circuit is normal when measuring as following.

- Photointerrupter (Ref. No. PD)
  H : more than 0.6 V at collector
  L : less than 0.3 V at collector
- Transistor
  H : more than 4 V at collector
  L : 0 V at collector

• VTR System-1

Procedure	LCD display	VF screen	Related circuit
Press the ADVANCE button so that the MODE "5" is displayed.	5	VTR DIAG MODE-1 FUNCTION KEY/LAMP CHECK	
Press the SHIFT button.	5	PUSH FF KEY	
Press the F FWD button.	5	PUSH FF KEY OK ↓ PUSH REW KEY	S2, CN1-6/KY-124→CN59-6/MB-317/P →IC202-7/MB-317/P
Press the REW button.	5	PUSH REW KEY OK ↓ PUSH PLAY KEY	S4, CN1-4/KY-124→CN59-4/MB-317/P →IC202-9/MB-317/P

(NOTE) If "OK" is displayed without pressing the appointed button, check a related circuit.

Procedure	LCD display	VF screen	Related circuit
Press the PLAY button.	5	PUSH PLAY KEY OK ↓ PUSH STOP KEY	S3, CN1-3/KY-124→CN59-3/MB-317/P →IC201-9/MB-317/P
Press the STOP button.	5	PUSH STOP KEY OK ↓ PUSH EJECT KEY	S1, CN1-7/KY-124→CN59-7/MB-317/P →IC201-7/MB-317/P
Press the EJECT button.	5	PUSH EJECT KEY OK ↓ PUSH START KEY	S5, CN1-5/KY-124→CN59-5/MB-317/P →IC202-6/MB-317/P

Procedure	LCD display	VF screen	Related circuit
Press the START button.	5	PUSH START KEY OK ↓ PUSH RETURN KEY	Connect the SY-117C/P board to the EX-148 board CN58-A3/MB-317/P→CN1-48/SY-117C/P
Press the RETURN button. Check that the following lamps are turned on. • REC TALLY (Viewfinder) • BATTERY INDICATOR (Viewfinder) • TALLY • PLAY • F FWD • REW • WARNING	5	PUSH RETURN KEY OK ↓ FUNCTION LAMP ALL ON PUSH ADVANCE	CN58-B3/MB-317/P→IC202-3/MB-317/P Check for continuity • PLAY lamp IC1-3/AU-97/P→CN10-12/MB-317/P →CN59-10/MB-317/P→CN1-10/KY-124 • F FWD lamp IC1-1/AU-97/P→CN10-14/MB-317/P →CN59-8/MB-317/P→CN1-8/KY-124 • REW lamp IC1-2/AU-97/P→CN10-13/MB-317/P →CN59-9/MB-317/P→CN1-9/KY-124

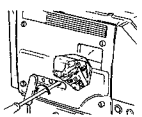
Procedure	LCD display	VF screen	Related circuit
Press the ADVANCE button so that the MODE "6" is displayed.	6	VTR DIAG MODE-2 PHOTO INT. CHECK-1	
Press the SHIFT button.	6	ROTATE CAM GEAR POSITION A C-IN SW I C-LCK SW L	
Turn the gear by the phillips type screwdriver into the hole for the gear.  Confirm that the display on the VF screen is changed as described in the table-1 in the next page by turning the gear.	6	ROTATE CAM GEAR POSITION C-IN SW C-LCK SW	• C-IN SW PD34-3/MB-317/P→Q34-C/MB-317/P →IC201-1/MB-317/P • C-LCK SW PD31-3/MB-317/P→Q31-C/MB-317/P →IC201-3/MB-317/P

Table-1

POSITION	C-IN SW	C-LCK SW	MODE	CODE
1	O	O	BO	0001
2	O	O	EJECT	0011
3	O	O	B1	0010
4	O	L	STBY	0110
5	O	L	B2	0111
6	O	L	LOAD	0101
7	I	L	B3	0100
8	I	L	FF/REW	1100
9	I	L	B4	1101
A	I	L	STOP	1111
B	I	L	B5	1110
C	I	L	FWD	1010
D	I	L	B6	1011
E	I	L	REV	1001
F	I	L	B7	1000

- [C-IN SW] O:OUT I:IN
  When the cassette is not inserted, "0" is always displayed.

- [C-LCK SW] O:OPEN L:LOCK

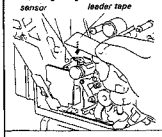
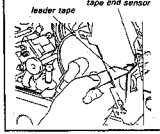
- [CODE]
  Remove the mechanical deck block and extend it by the Extension Harness which is prepared for service.

  BIT-3 (4)/SR-40→CN1-8/TB-5→CN44-8/MB-317/P→CN1-36/SY-117C/P
  BIT-2 (3)/SR-40→CN1-9/TB-5→CN44-9/MB-317/P→CN1-37/SY-117C/P
  BIT-1 (2)/SR-40→CN1-10/TB-5→CN44-10/MB-317/P→CN1-38/SY-117C/P
  BIT-0 (1)/SR-40→CN1-11/TB-5→CN44-11/MB-317/P→CN1-39/SY-117C/P

• VTR system-3

This mode should be performed after setting POSITION to "6" in MODE "5".

Procedure	LCD display	VF screen	Related circuit
Press the ADVANCE button so that the MODE "7" is displayed.	7	VTR DIAG MODE-3 PHOTO INT. CHECK-2	
Press the SHIFT button.	7	PUSH SENS SW M/O M M-REC D O-REC D NEXT-PLAY	
Press the METAL/OXIDE switch. (This switch detects an oxide and "0" is displayed.)	7	PUSH SENS SW M/O 0 M-REC D O-REC D NEXT-PLAY	PD33-3/MB-317/P→Q33-C/MB-317/P →IC202-1/MB-317/P
Press the METAL MISS REC switch. ("E" of enable is displayed.)	7	PUSH SENS SW M/O M M-REC E O-REC D NEXT-PLAY	PD32-3/MB-317/P→Q32-C/MB-317/P →IC201-2/MB-317/P
Press the OXIDE MISS REC switch. ("E" of enable is displayed.)	7	PUSH SENS SW M/O M M-REC D O-REC E NEXT-PLAY	PD35-3/MB-317/P→Q35-C/MB-317/P →IC202-2/MB-317/P
Press the PLAY BUTTON.	7	TAPE TOP/END CHECK TOP	

Procedure	LCD display	VF screen	Related circuit
Close the leader tape such as a piece of aluminium with the tape beginning sensor. (The tape beginning is detected and "DET" is displayed on the VF screen.) 	7	TAPE TOP/END CHECK TOP DET TAPE TOP/END CHECK TOP DET END	Short between TP47/EX-148 board and TP50 (+5V) /EX-148 board with a shorting clip. After making sure that the CN in the parentheses is "H", check the following points. Normally, the points are "H", when closing the leader tape, the points are "L". IC1-3/FE-4(IC1-1 "H") CN43-4/MB-317/P(CN43-5 "H") CN1-46/SY-117C/P(CN1-47 "H")
Close the leader tape such as a piece of aluminium with the tape end sensor. (The tape end is detected and "DET" is displayed on the VF screen.) 	7	TAPE TOP/END CHECK TOP DET END DET TAPE TOP/END CHECK TOP DET END DET PUSH ADVANCE	Short between TP47/EX-148 board and TP1 (GND) /EX-148 board with a shorting clip. After making sure that the CN is the parentheses is "H", check the following points. Normally the points are "H", when closing the leader tape, the points are "L". IC1-3/FE-4(IC1-1 "H") CN43-4/MB-317/P(CN43-5 "L") CN1-46/SY-117C/P(CN1-47 "L")

• VTR system-4

This mode should be performed after setting POSITION to "8" in MODE "6".

Procedure	LCD display	VF screen	Related circuit
Press the ADVANCE button so that the MODE "8" is displayed.	8	VTR DIAG MODE-4 DRUM/CAP MOTOR ON	
Press the SHIFT button.	8	DRUM ON OK ↓ DRUM ON OK NEXT-PLAY	• When "NG" is displayed. Refer to fig. 1. (Page. 1-31)
Press the PLAY button.	8	CAP F-ON T-RL FG ↓ CAP F-ON OK T-RL FG OK NEXT-PLAY	When "NG" is displayed. • CAP F-ON Refer to fig. 2. (Page. 1-32) • T-RL FG PD37-4/MB-317/P→Q37-C/MB-317/P →CN1-3/SY-117C/P

Procedure	LCD display	VF screen	Related circuit
Press the PLAY button.	8	CAP R-ON S-RL FG	
		CAP R-ON OK S-RL FG OK PUSH ADVANCE	When "NG" is displayed. • CAP R-ON Refer to fig. 2. (Page. 1-32) • S-RL FG PD36-4/MB-317/P→Q36-C/MB-317/P →CN1-4/SY-117C/P
Press the ADVANCE button and the MODE "0" is displayed.	0	HOURS METER DISPLAY	

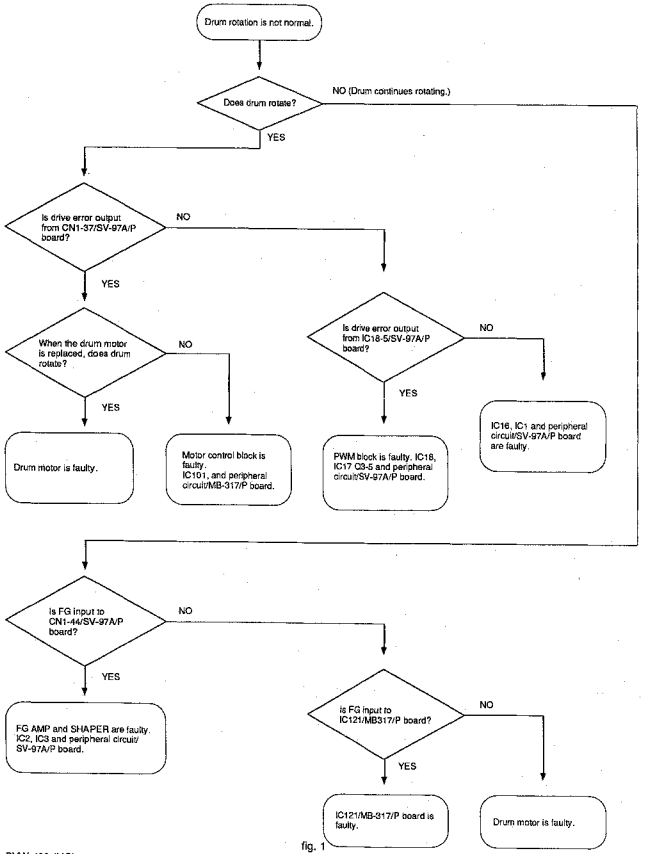

Drum rotation is not normal.
Does drum rotate?
NO (Drum continues rotating.)
YES
Is drive error output from CN1-57/SV-97A/P board?
NO
YES
When the drum motor is replaced, does drum rotate?
NO
YES
Drum motor is faulty.
Motor control block is faulty. IC101, and peripheral circuit/MB-317/P board.
Is drive error output from IC18-5/SV-97A/P board?
NO
YES
PWM block is faulty. IC18, IC17 Q3-5 and peripheral circuit/SV-97A/P board.
IC16, IC1 and peripheral circuit/SV-97A/P board are faulty.
Is FG input to CN1-44/SV-97A/P board?
NO
YES
FG AMP and SHAPER are faulty. IC2, IC3 and peripheral circuit/ SV-97A/P board.
Is FG input to IC121/MB317/P board?
NO
YES
IC121/MB-317/P board is faulty.
Drum motor is faulty.

fig. 1

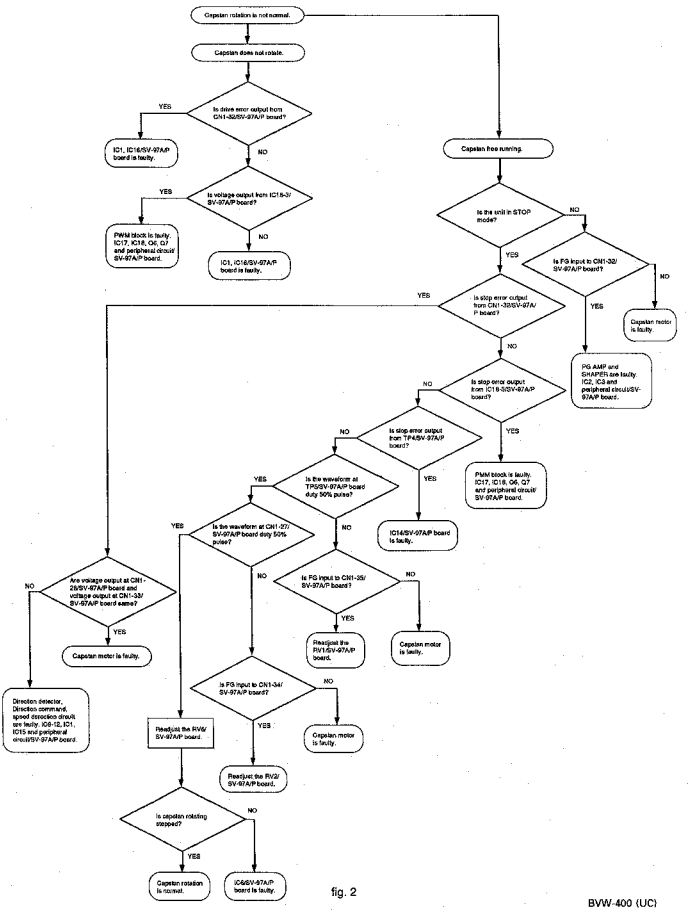

Capstan rotation is not normal.
Capstan does not rotate.
Is drive error output from CN1-32/SV-97A/P board?
YES
NO
IC1, IC16/SV-97A/P board is faulty.
Is voltage output from IC15-3/ SV-97A/P board?
YES
NO
PWM block is faulty. IC17, IC18, Q6, Q7 and peripheral circuit/ SV-97A/P board.
IC1, IC16/SV-97A/P board is faulty.
Capstan free running.
Is the unit in STOP mode?
NO
YES
Is FG input to CN1-32/ SV-97A/P board?
YES
NO
Capstan motor is faulty.
Is stop error output from CN1-33/SV-97A/ P board?
YES
NO
PG AMP and S/H/APF/Limiter faulty. IC2, IC3 and peripheral circuit/SV-97A/P board.
Is stop error output from IC16-32/SV-97A/P board?
NO
YES
Is stop error output from TP4/SV-97A/P board?
NO
YES
Is the waveform at TP2/SV-97A/P board duty 50% pulse?
YES
NO
PWM block is faulty. IC17, IC18, Q6, Q7 and peripheral circuit/ SV-97A/P board.
IC14/SV-97A/P board is faulty.
Is the waveform at CN1-27/ SV-97A/P board duty 50% pulse?
YES
NO
Are voltage output at CN1-28/SV-97A/P board and voltage output at CN1-33/ SV-97A/P board same?
NO
YES
Capstan motor is faulty.
Is FG input to CN1-35/ SV-97A/P board?
NO
YES
Readjust the RV1/SV-97A/P board.
Capstan motor is faulty.
Direction detector, Direction command, speed detection circuit are faulty. IC6-12, IC1, IC15 and peripheral circuit/SV-97A/P board.
Is FG input to CN1-34/ SV-97A/P board?
NO
YES
Readjust the RV5/ SV-97A/P board.
Capstan motor is faulty.
Readjust the RV2/ SV-97A/P board.
Is capstan rotating stopped?
NO
YES
Capstan rotation is normal.
IC6/SV-97A/P board is faulty.

fig. 2

1-8. ERROR CODE DISPLAY

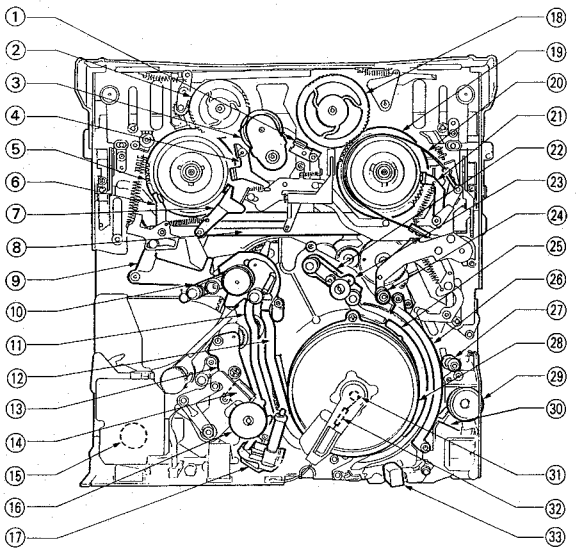
When the tape is slackened in the unit, its error cause and its error mode are displayed on the LCD Display.

MODE
0 : STOP
1 : REC
2 : THREAD / UNTHREAD
3 : REC PAUSE
6 : FF
A : REW
C : PLAY

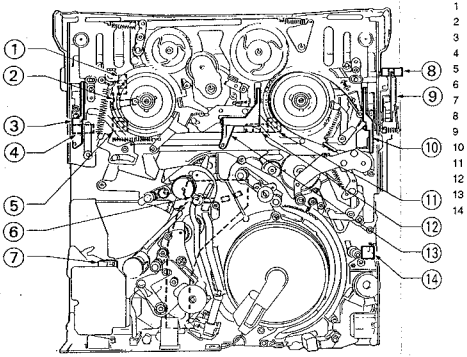
ERROR CAUSE
1: REEL
2 : ROTOR
3 : THREAD MOTOR
4 : DRUM
5 : CAPSTAN

1-9. LOCATION OF MAIN PARTS

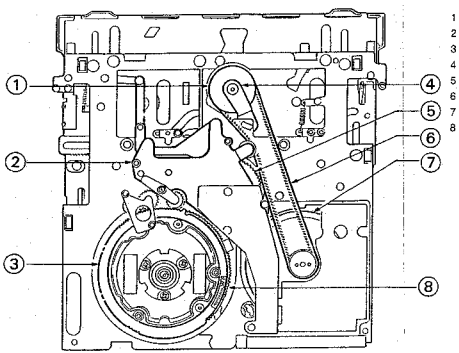
1-9-1. Location of the Mechanical Main Parts / Components



1 Supply Side Main Brake
2 Take-up Side Idler
3 Gear
4 Take-up Side Main Brake
5 Take-up Side Reel Table
6 Take-up Side Sub Soft Brake
7 Take-up Side Soft Brake
8 Reel Slider
9 Main Pinch Arm
10 Sub-pinch Arm
11 Take-up Side Rail (O)
12 Take-up Side Rail (I)
13 Threading Gear
14 Audio/TC Confi Head
15 Threading Motor
16 IR-3
17 Take-up Side Sub-base
18 Supply Side Idler
19 Supply Side Reel Table
20 Tension Regulator Band
21 Supply Side Soft Brake
22 Supply Side Base
23 Supply Side Sub-base
24 Tension Regulator
25 Supply Side Rail (O)
26 Supply Side Rail (I)
27 TG-1
28 Drum
29 IR-1
30 Full Erase Head
31 Slip Ring
32 Brush
33 CTL Head



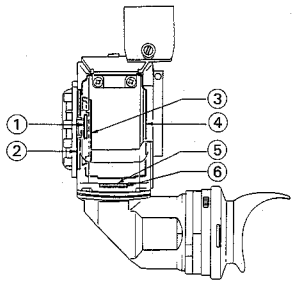
1 Cassette Detection Sensor
2 Cassette Detection Shutter
3 Miss-REC Lever A
4 Miss-REC Sensor
5 Take-up Reel Rotation Detector
6 Mechanical Function Control Sensor
7 Tape Beginning Sensor
8 Cassette-up Compartment Lock Sensor
9 Lock Arm
10 Miss-REC Lever B
11 Supply Reel Rotation Detector
12 Metal/Oxide Selector
13 Metal Detection Lever
14 Tape End Sensor



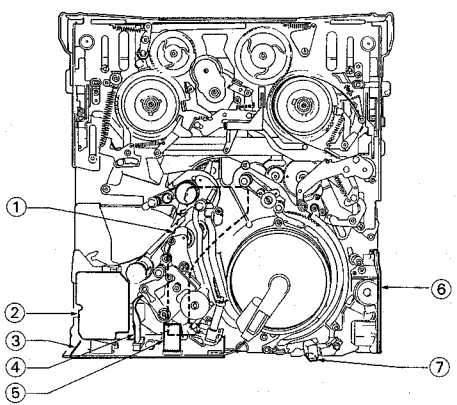
1 Relay Pulley
2 Cam Gear Base
3 Threading Ring T
4 Gear Base
5 Function Cam
6 Timing Belt
7 Capstan
8 Threading Ring S

SONY-SP0627 / DRUCK 3

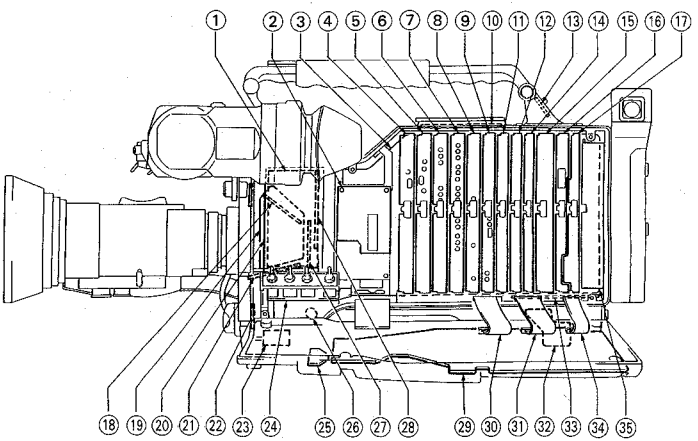
1-9-2. Location of the Printed Circuit Boards



1 LP-42 Board
2 VR-67 Board
3 SW-260A Board
4 VF-32 Board
5 LP-40 Board
6 LP-58 Board



1 SR-40 Board
2 LD-21 Board
3 TB-5 Board
4 FL-55/P Board
5 FL-53 Board
6 FE-4 Board
7 DUS-246 Board



1 PA-120 Board
2 IF-298 Board
3 MB-317/P Board
4 AT-49A Board
5 IE-30/P, *IE-31 Board
6 VA-104 Board
7 PR-132A/AP Board
8 EN-79/U Board
9 SG-152/AP Board
10 KY-124 Board
11 VP-24/P Board
12 VDA-11/P Board
13 SW-291 Board
14 AFM-6/P Board
15 AU-97/P Board
16 SV-97A Board
17 SY-117C Board
18 BI-31 Board
19 CN-304 Board
20 DR-124 Board
21 BI-30 Board
22 SW-357B Board
23 DC-DC CONVERTER UNIT
24 SW-220 Board
25 VR-70 Board
26 VR-77 Board
27 BI-29 Board
28 TG-82 Board
29 TC-48A Board
30 FL-45 Board
31 FL-46 Board
32 CN-400 Board
33 PS-162 Board
34 FL-57 Board
35 CD-89 DC-DC CONVERTER

* Serial No. 10011 and higher (UC)
40001 and higher (EK)

SONY-SP0627 / DRUCK 4

1-10. PRINTED CIRCUIT BOARDS

SYSTEM	CIRCUIT BOARD	CIRCUIT FUNCTION
CAMERA	CN-304	Connector PCB for BI-29, 30, and 31
	BI-29 BI-30 BI-31	CCD mount
	TG-82/P	Timing Generator
	TG-53	Sub Timing Generator
	PA-120	Pre-amp (Sample & Hold)
	DR-124 VA-104	CCD Driver Video Amp, Black Set, Total Gain Change, Shading Compensator
	IE-30/P *IE-31	Image Enhancer Aperture
	PR-132A /AU	Gamma, Masking, Knee, Slope, W. Clip, Dynamic Contrast Control
	EN-79U/P	Y/R-Y/B-Y Signal Generator for VTR, Encoder, Color Bars Generator
	SG-152/AP SG-157/P	Sync Generator, Genlock, Sub-regulator
	AT-49A	Auto White/black Function, VF Character Generator, System Controler, Audio Level Detector
	SW-220	SAVE-STBY, Color Bars ON/OFF, DCC ON/OFF, Memory A/B/Preset SW
	SW-357B	Auto White/Black SW VTR Start/Stop SW Shutter ON/OFF Select
	VR-77	Master Black VR
	IF-298	26P Interface, Logic, VF Marker Gen.

SYSTEM	CIRCUIT BOARD	CIRCUIT FUNCTION
VIDEO	VDA-11/P	CTDM and C-Modulator
	AFM-6/P	Y-Modulator, AFM
	VP-24/P	Video Playback, Head Select Pulse Generator
AUDIO	AU-97/P	Audio REC/PB Processor
	TB-5	Terminal Board, Audio Confi PB
	FL-55/P	Audio Head AMP, Relay Board for TB and A/T Head
SERVO	SV-97A/P	Drum/Capstan Servo
SYSTEM CONTROL	SY-117C/P	System Control
	KY-124	Function Key Board
TIME CODE	TC-48A/P	Time Code Generator, Audio Level Control, Audio Monitor AMP, SW and Indicator for Audio and TC
	VR-70	Volume
POWER	PS-162	Power Distributor
SENSOR	FE-4	Full Erase, Dew and End Sensor
	LD-21	Loading Motor Driver and END Sensor
	SR-40	Mechanical Position Sensor

* Serial No. 10011 and higher (UC)
40001 and higher (EK)

SYSTEM	CIRCUIT BOARD	CIRCUIT FUNCTION
OTHERS	MB-317/P	Mother Board
	SW-291	Back Tally
	FL-45	Relay Board for MB and TC
	FL-46	Relay Board for MB and TC
	FL-53	Relay Board for TB and SR
	FL-57	Relay Board for PS and TC
	EX-148	Extension Board

SYSTEM	CIRCUIT BOARD	CIRCUIT FUNCTION
VIEW-FINDER	VF-32	Drive and Video Amp for Viewfinder, Peaking Signal Generator
	LP-40	REC LED
	LP-42	Front Tally LED
	LP-58	BATT/VTR SAVE LED
	VR-67	Contrast, Bright, Peaking, Audio Level (CH-1) VR
	SW-260A	Tally ON/OFF, Audio Level Indicator ON/OFF, Zebra/Marker ON/OFF SW

1-11. CIRCUIT DESCRIPTION

1-11-1. Camera System Circuit

(1) CCD CONTROL SYSTEM (TG-82/P, DR-124, BI-29, 30, 31 and PA-120 Boards)

• TG-82/P Board

It sends the pulse for driving the CCD to DR-124 board and the pulse for sampling the video signal output from the CCD to PA-120 board. Driving pulse synchronizes with the synchronizing signal sent from SG-152/AP board.

14.32 MHz counted down from 28.64 MHz is also supplied to SG-152 board. (for UC model)

14.1875 MHz counted down from 28.375 MHz is also supplied to SG-152AP board. (for EK model)

• DR-124 Board

It converts the driving pulse sent from TG-82/P board so as to drive the CCD directly. Converted pulse is sent to BI-29, 30, 31 board and transmitted to the CCD.

The regulator circuit generates +29V by +15V

• BI-29, 30, 31 Boards

CCD is mounted in this board. Driving pulse and DC control voltage are added to the CCD.

The video signal output from the CCD is sent through the emitter follower to PA-120 board.

• PA-120 Board

It eliminates the pulse component of the video signal sent from BI-29, 30, 31 boards. Then the signal processings such as the amplification by preamplifier are performed on the board, then the video signal is sent to VA-104 board.

(2) VIDEO SIGNAL SYSTEM (VA-104, IE-30/P, *IE-31, PR-132A/U and EN-79U/P Boards)

• VA-104 Board

It amplifies the video signal sent from PA-120 board and processes the black shading correction, gain-up control, blanking cleaning and white shading correction. It also selects the video signal or TEST SAW signal.

• IE-30/P, *IE-31 Board

It generates the detail signal obtained from G and R video signals so as to improve resolution. The detail signal is sent to PR-132 A/U board, then added to R, G and B video signals. G video signal is delayed by 1H, then sent to PR-132A/U board.

On the IE-31 board the aperture signal generated from the G video signal in mixed with the detail signal.

• PR-132A/U Board

The masking signal and detail signal are added to R, G and B video signals respectively and the flare compensation, pedestal control, knee correction, white clipping and gamma correction are performed on the board.

Then the video signal is sent to EN-79U/P board.

• EN-79U/P Board

It generates the luminance (Y) signal, color difference (R-Y, B-Y) signals and composite video (VBS) signal obtained from R, G and B video signals. It also supplies the SMPTE color-bar signals without I, Q signals for UC model, EBU color bar signals for EK model.

* Serial No. 10011 and higher (UC)
40001 and higher (EK)

(3) POWER SUPPLY SYSTEM (CD-89 DC-DC converter)

• CD-89

CD-89 switching regulator generates the voltages of +9.0 Vdc and –9.0 Vdc, +5 Vdc and -5 Vdc and SW'D +6V for the respective boards from the externally supplied unregulated dc power.

It also supplies voltages for the viewfinder (+9.3V) and for CCD control (+15V, +7V) and for microphone (+48V).

SW'D +6V, +20V, +6.5V and +48V are ON or OFF by the system control signal according to various modes respectively.

(4) SYNCHRONIZING SIGNAL SYSTEM (SG-152/P Board)

• SG-152/AP Board

It generates various synchronizing signals.

It detects the external genlock signal automatically and synchronizes with it.

Then, it contains the auto iris circuit that controls the iris by detecting the video signal level at any time, the regulator circuit generates +8.5V, +4.6V, –4.5V sent the video signal system, and the regulator circuit generates +4.7V for the CCD control system by +9V, +5V, –5V supplied from CD-89.

(5) AUTOMATIC CONTROL SYSTEM (AT-49A Board)

• AT-49A Board

Microcomputer unit on the AT-49A board sends to the control signal and compensation signal to appropriate boards in accordance with the selection of function switches.

It also detects the position of color temperature conversion filter, pedestal control and video level automatically, then compensates the video signals and displays various warnings.

Besides it contains the interface circuit with remote control unit RM-P3 (optional) and the level detection circuit to display the audio level.

(6) INTERFACE SYSTEM (IF-298 Board)

• IF-298 board

The IF-298 board mainly consists of three blocks: the 26-pin interface block, logic block for external VTR REC START/STOP control, and VF MARKER GEN. block.

1-12. FUNCTION OF THE SENSORS

(1) Miss-REC Switch (for metal particle tape)
This is a record-proof switch for metal particle tape.

(2) Miss-REC Switch (for oxide tape)
This is a record-proof switch for oxide tape.

(3) Oxide/Metal Particle Tape Detection Switch
This switch detects whether an oxide tape or a metal particle tape is being used.

(4) Cassette-in Switch
This switch detects whether a cassette is being inserted.

(5) Cassette-up Compartment Lock Switch
This switch detects that the Cassette-up Compartment is locked.
When the Cassette-up Compartment is locked, threading is performed.
When EJECT mode, the Cassette-up Compartment is opened, the EJECT mode is finished.

(6) Cam Position Sensor
This sensor detects whether the Cam is moved to the designed position or not.

(7) Temperature Detection Sensor
This sensor detets the temperature and then Black correction is performed.

1-13. USE UNDER SPECIAL ENVIRONMENT (MEASURE FOR COLD AREA)

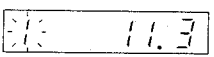
The BVW-400P is guaranteed its operation under the temperature of 0°C to 40°C.
When the unit is used out of the above temperature, covercloth against the cold (LKW-200) is recommended.

1-14. VOLTAGE CHANGING OF BATTERY BEFOR END

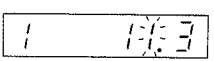
Voltage of battery before end can be changed by the following procedures described below.
Setting available range : 11.0 V to 13.0 V
Setting available minimum unit : 0.1 V
When the unit is shipped, this is set to 11.30V.

1. Press the DIAGNOSTIC switch on the side panel, and put into the DIAGNOSTIC mode.
   (Refer to Sec.1-7)

2. Press the ADVANCE button on the side panel, so that set the MODE "1".
   Then, the voltage of battery before end is displayed on the LCD-display.

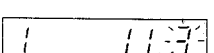


3. Press the SHIFT button on the side panel so that blinking the first digit.



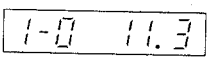
4. Set the desired figure pressing the ADVANCE button.

5. Press the SHIFT button so that blinking the decimal digit.

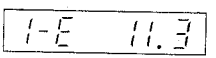


6. Set the desired figure pressing the ADVANCE button.

7. Press the SHIFT button. Then the desired voltage is stored in the ROM.
   If the value is stored in the ROM, "0" is displayed automatically.



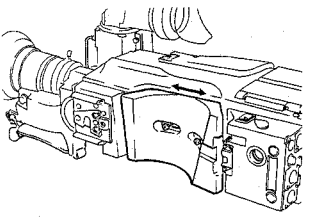
If the value can be not stored in the ROM because of the error, display the following.



In this case, press the ADVANCE button and then repeat the above procedures.

1-15. RELOCATING THE SHOULDER PAD

Loosen the two fixing screws in the figure and relocate the shoulder pad to the desired position. Then tighten the screws. Can be moved ±10 mm back and forth



1-16. REMOTE CONTROL OF THE CAMERA SYSTEM

The camera system of the BVW-400/400P can be remote controled with the remote control unit RM-P3 (optional).
Connect a REMOTE connector of the BVW-400/400P to a REMOTE connector of the RM-P3 with a cable. The remote cable can extend a maximum of 100m.
When RM-P3 is disconnected from the unit with turning ON the POWER switch, the unit maintains the REMOTE mode. Therefore, the GAIN selector and so on of the unit are not functioned.
Turn OFF the POWER switch, and turn ON again, the REMOTE mode is released.
In this case, MASTER PED and WHITE BAL data and so on are not remained setting by the RM-P3.

1-17. SUPPLIED ACCESSORIES

Supplied BVW-400/400P accessories are as follows.

(1) Shoulder strap
(2) Extension board (EX-148)
(3) Rain cover
(4) Tripod adaptor (VCT-14)
(5) Microphone
(6) Carrying case (LC-201)....EK Only
(7) Operation manual.
Maintenance manual vol-1, vol-2

1-18. OPTIONAL ACCESSORIES

The followings are the accessories. Use the suitable accessory according to the need.

• AC Power Adaptor : AC-500 (UC), AC-500CE (EK)
The VTR can be driven by an AC power source from the AC adaptor, AC-500/CE. The AC-500/CE is worldwide type of adaptor. AC-500/CE can be used with 100 / 120 / 220 / 240V commercial power supplies just by setting the voltage selector to the appropriate position for a stable supply of DC power.

• Remote Control Unit : RM-P3
The camera system of the BVW-400/400P can be remote controled by connecting a REMOTE connector of the BVW-400/400P to a REMOTE connector of the RM-P3 with a cable. The remote cable can extend a maximum of 100m.

• Battery Pack : NP-1A, NP-1, BP-90A, BP-90
They are the chargeable 12V battery pack. NP-1A's capacity is 1.7 Ah, that of the NP-1 is 1.5 Ah, and that of the BP-90A is 5.0 Ah and that of the BP-90 is 3.5 Ah.

• Battery Charger : BC-1WA, BC-210
The BC-1WA battery charger is designed to charge NP-1A/1 battery packs. Four NP-1A/1 battery packs can be inserted at one time, and will be charged in sequence automatically.
The BC-210 battery charger is designed to charge BP-90A/90 battery packs. Four BP-90A/90 battery packs can be inserted and charged at one time automatically.

• Battery Adaptor : DC-500, DC-520, DC-210
The battery case, DC-500 is for the battery pack, BP-90A/90, DC-520 can insert the two NP-1A/1 with the standard battery case.
DC-500 can be replaced for the standard battery case supplied the BVW-400/400P.

• Wireless Microphone System
UHF portable tuner : WRR-27
UHF portable tuner : WRR-28L
UHF transmitter : WRT-27
The audio sound can be recorded on the tape without wire cable by using these wireless microphone system.

• Playback Adaptor : VA-500/CE
Connect the VA-500 with the BVW-400P, the color playback picture can be obtained. Either the composite signal or the VHF RF signal can be output.

• VF rotate bracket : BKW-401
The BKW-401 is a rotating housing mechanism for the VF of the Betacam camera. The range of rotation is from the horizontal position (operating condition) to 90°. It also provides the existing front and rear sliding mechanism.

• VTR connector unit : BKW-402
This kit is used to connect the BVW-400P to the BVW-35/35P/25/25P portable video cassette recorder using the CCZ 26-pin cable. This arrangement enables simultaneous recording using the built-in VTR and external VTR by component signal.

• Camera grip : CAC-GR01
When this grip is attached to the camera, you can have functions such as START/STOP recording, REC REVIEW, and ZOOM at your fingertips.
Only the 12-pin connector standard lens can be used.

• 3-inch viewfinder : BVF-3

• 5-inch viewfinder : BVF-50
Please refer to OPERATION MANUAL for more information on installation.

• Earphone : ME-20B

• Microphone : C-74

• Microphone Holder : CAC-12

• Cradle Suspension : CRS-3P

• Carrying Case : LC-201 (EK Only)

• UHF portable tuner attachment kit: BTA-27

• Cassette Tape : BCT-5M / 10M / 20M / 30M
BCT-5K / 10K / 20K / 30K

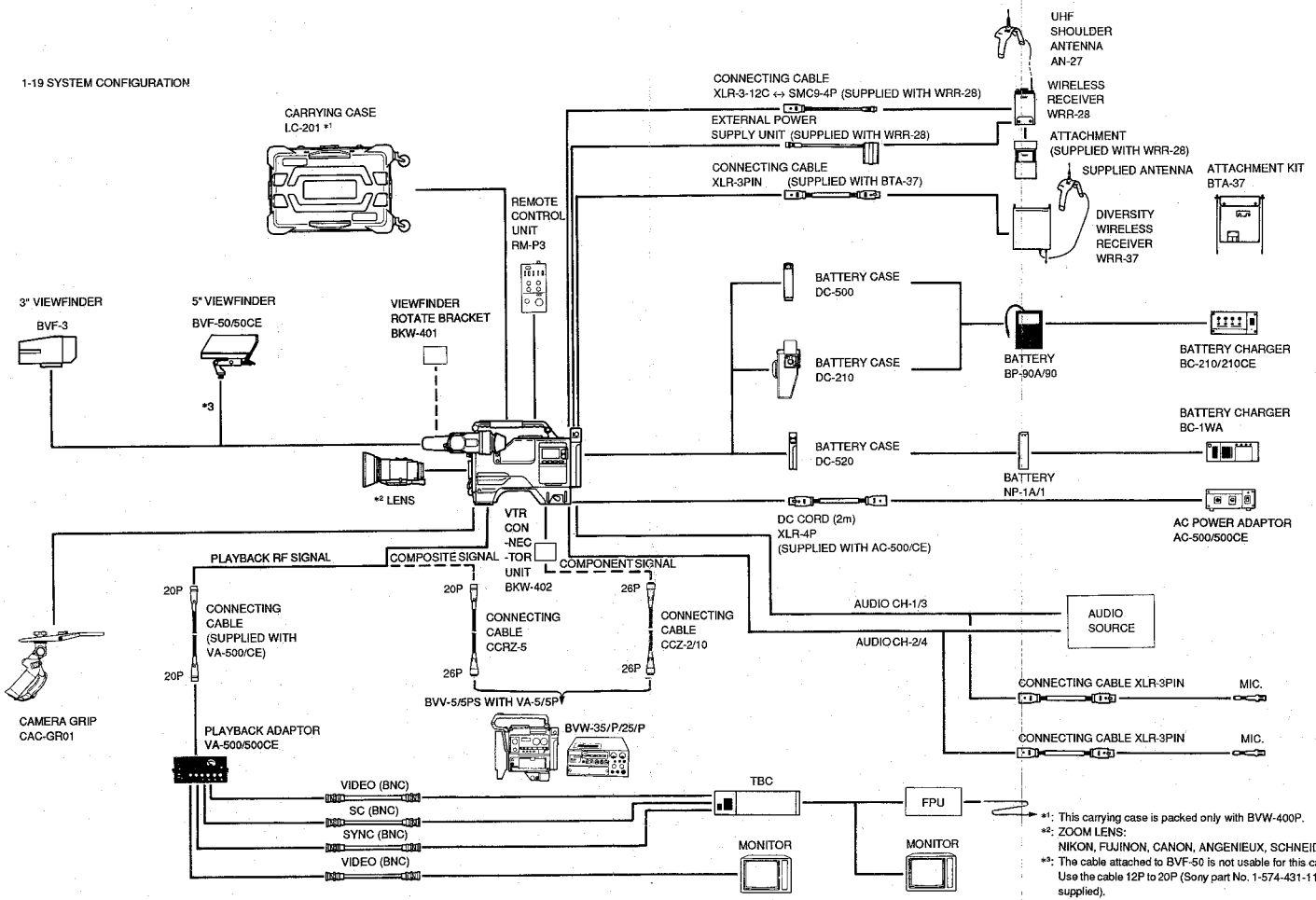
• Portable Videocassette Recorder : BVW-35/P, BVW-25/P

• BVW-35/25 Connection Cable : CCRZ-5, CCZ-2/10

• Cleaning Cassette: BCT-5CLN

• FP (fog-proof) Filter

• VF Extended Arm Assy for Left Eye



*1: This carrying case is packed only with BVW-400P.
*2: ZOOM LENS:
NIKON, FUJINON, CANON, ANGENIEUX, SCHNEIDER
*3: The cable attached to BVF-50 is not usable for this case. Use the cable 12P to 20P (Sony part No. 1-574-431-11 not supplied).

SECTION 2
PERIODIC CHECK AND MAINTENANCE

2-1. MAINTENANCE TIME TABLE

ITEM	Part No.	HOURS METER MODE	500 (H)	1,000 (H)	1,500 (H)	2,000 (H)	2,500 (H)	3,000 (H)	3,500 (H)	4,000 (H)	4,500 (H)	5,000 (H)	5,500 (H)
Upper drum	A-6782-418-(UC) A-6762-406-(EK)	A	♦	♦	♦	♦	♦	♦	♦	♦	♦	♦	♦
Tension regulator band	X-3722-325-	B	–	♦	–	♦	–	♦	–	♦	–	♦	–
Supply side soft brake	X-3722-324-	B	–	♦	–	♦	–	♦	–	♦	–	♦	–
Take-up side soft brake	X-3722-323-	B	–	♦	–	♦	–	♦	–	♦	–	♦	–
Supply side idler	A-6740-092-	B	–	–	–	–	–	♦	–	–	–	–	–
Take-up side idler	A-6740-091-	B	–	♦	–	♦	–	♦	–	♦	–	♦	–
Pinch roller	X-3722-363-	B	♦	♦	♦	♦	♦	♦	♦	♦	♦	♦	♦
Timing belt	3-722-452-	B	–	–	♦	–	–	♦	–	–	♦	–	–
Slip ring	A-6050-652-	A	–	♦	–	♦	–	♦	–	♦	–	♦	–
Brush	A-6050-648-	A	–	♦	–	♦	–	♦	–	♦	–	♦	–
Lower drum *3	A-6050-673-(UC) A-6050-611-(EK)	B	–	–	♦	–	–	♦	–	–	♦	–	–
Gear	X-3722-306	B	–	♦	–	♦	–	♦	–	♦	–	♦	–
Slantness table (rail)	3-725-214- 3-725-215- 3-725-217- 3-725-218-	B	–	O	–	O	–	♦	–	O	–	O	–
Threading cam gear	A-6737-190- A-6750-231- A-6750-233-	B	–	–	–	–	–	♦	–	–	–	–	–
Sensor on the reel Table	———	B	–	O	–	O	–	O	–	O	–	O	–

- Threading motor B 1,500H
- Capstan motor B 1,500H
- Full erase head B 1,500H
- CTL head B 1,500H
- A/T head B 1,000H

(NOTE) 1 HOURS METER MODE A: DRUM RUNNING METER
B: TAPE RUNNING METER
C: OPERATION METER

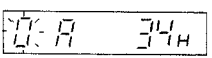
3 Replacement of the Head drum ass'y

2 ♦: Replacement
O: Cleaning

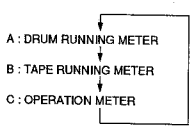
2-2. HOURS METER

BVW-400/400P has an hours meter in the DIAGNOSTIC mode. It displays the accumulated time of drum rotating time, tape running time, and VTR turning on time on the display on the side panel.
It is recommended to perform the periodic checks and maintenance based on the hours meter.
Hours meter can be displayed by the following procedures described below.

1. Press the DIAGNOSTIC switch on the side panel and put into the DIAGNOSTIC mode.
   "DRUM RUNNING METER" is displayed.



2. By pressing the SHIFT button on the side panel, the display rotates in the following sequence.



3. To end the DIAGNOSTIC mode, press the DIAGNOSTIC switch again.

(NOTE) If the TC-48A/AP board is replaced, be sure to replace the nonvolatile memory (Ref. No. IC515).

2-3. MAINTENANCE AFTER THE REPAIRS

Perform the following maintenance after repair without regarding the machine operating hours.

1. Video heads and stationary heads cleaning.
2. Tape movement area cleaning.

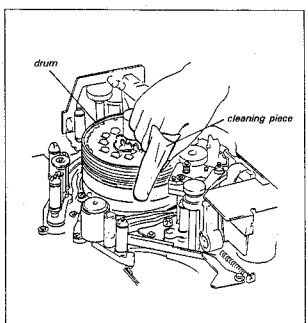
2-4. CLEANING PROCEDURE

The Cassette-up Compartment can be fully opened for cleaning. (Refer to Sec. 3-3)
Cleaning procedures are as follows. Be sure not to insert a cassette tape before the cleaning fluid evaporate completely.

2-4-1. Video Head

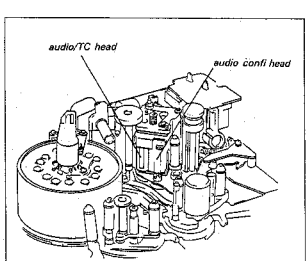
Press the cleaning piece moistened with the cleaning fluid and turn the drum slowly with hand.

(NOTE) • Never move the cleaning piece in the vertical direction of the head tip during cleaning.
• Clean the head with the power OFF.



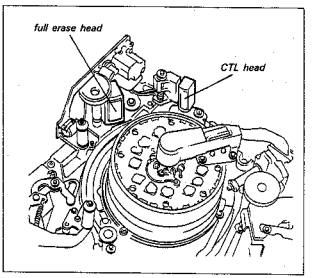
2-4-2. Audio/TC, Audio Confidence Heads

Clean with the cleaning piece moistened with the cleaning fluid.



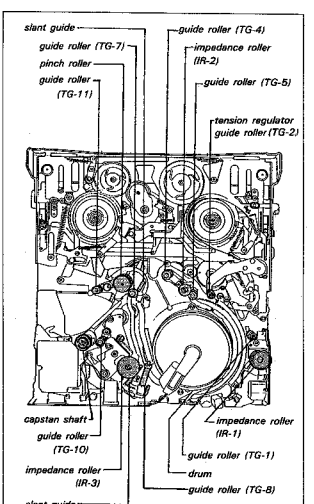
2-4-3. CTL, FE (Full Erase) Heads

Clean with the cleaning piece moistened with the cleaning fluid.



2-4-4. Tape Movement Areas

Clean with the cleaning piece moistened with the cleaning fluid; Tape guides, drum, capstan and the pinch roller as shown in the figure.

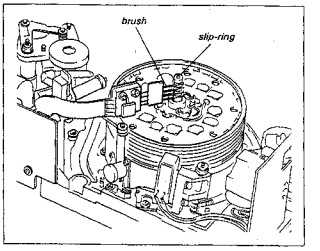


2-4-5. Slip-rings and Brushes

The Head Drum Assembly Slip-rings and Brushes do not require periodic cleaning. However, if dust adheres to the Slip-rings or Brushes, clean them as follows:

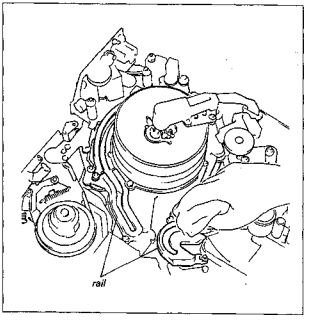
1. Clean the Slip-ring or Brush with a Soft brush which has short hairs. If this brush can not be obtained, use a Blower brush and Cotton Swab.
2. Cleaning fluid is not especially necessary. However, if it is difficult to remove persistent debris, use Freon as a cleaning agent.

(NOTE) • Do not use alcohol as a cleaning fluid. If the Slip-ring and the Brushes are cleaned with alcohol, the surface tends to attract material which may increase the resistance at the contact area.
• Do not use conductive grease.



2-4-6. Rail

Clean with the cloth moistend with the alcohol.

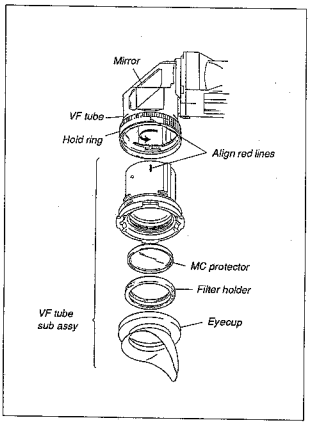


2-4-7. Viewfinder Lens

By extracting the VF tube sub assy, lens and MC protector can be easily cleaned. And also dust on the CRT surface or mirror can be easily cleaned off.

1. Turn the hold ring to the left and extract the VF tube sub assy.
2. Detach the eyecup.
3. Remove the MC protector together with the filter holder.
4. Clean the lens and MC protector with a commercially available camera lens cleaner. Blow off dust with a blower carefully so as not to flaw the mirror.
5. After the cleaning is completed, install by reversing the preceding steps. Align red lines of the VF tube and VF tube sub assy when inserting, and turn the hold ring to the right until it locks.

(NOTE)
- Do not use any type of solvent, such as alcohol, benzine or thinner to remove stains.
- Be sure to attach the eyecup to the VF, or the MC protector may come off.
- To protect the viewfinder lens from drops, put the MC protector in the filter holder and attach the eyecup securely.
- To prevent mist on a lens, an optional fog-proof filter (FP filter, Sony parts No. 1-547-341-11) is prepared. Use in place of the MC protector.



2-5. AFTER USED AT SEASIDE OR DUSTY AREAS

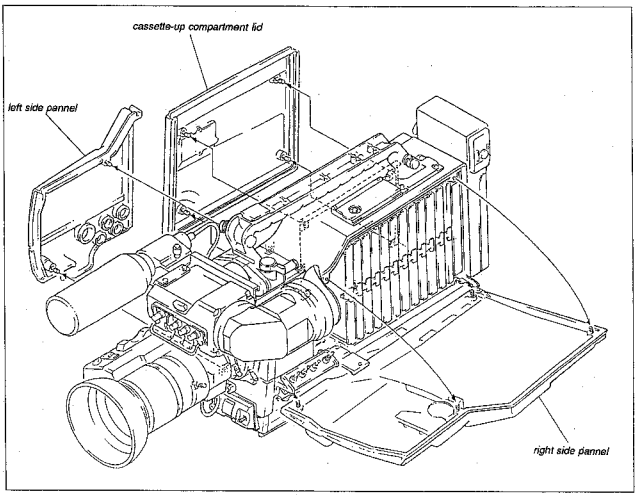
It is recommended to check the following items after the news gathering at seaside or dust areas.

1. Clean off sand and other dust in the unit with a cleaning piece moistened with the cleaning fluid, or blow off with an air-brush carefully.
2. Clean the video head and sationary heads with a cleaning piece moistened with the cleaning fluid.
3. Clean the tape movement areas (the drum surface, tape guides, capstan shaft and the pinch roller) with a cleaning piece moistened with the cleaning fluid.
4. Clean the upper of chassis of the unit.
5. Clean the surface of the reel tables contacting with the brake shoes.
6. Rotate by hand and move the tape guides, pulley, capstan and the pinch roller, and check that any abnormal noise sounds or not. If there sounds a noise, replace the part immediately.
7. After the news gathering at seaside, remove the printed circuit board.
   Clean the printed circuit board with a cleaning piece moistened with the cleaning fluid after blow off sand on the completely. Then clean the soldering side in the same manners.
8. Clean the connector on the connector panel completely.
9. Perform the operation check and be sure that the machine operates normally.

SECTION 3
SERVICE INFORMATION

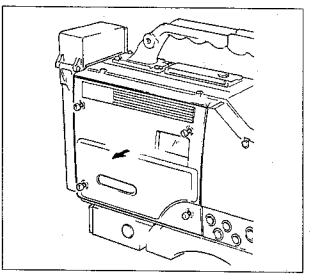
3-1. REMOVAL OF THE CABINET

Loosen the fixing screws shown in the figure, and remove the panels.

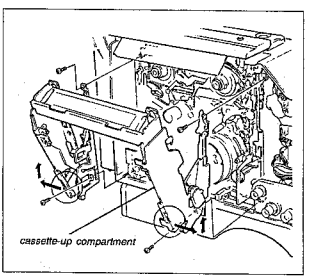


3-2. REMOVAL OF THE CASSETTE-UP COMPARTMENT

1. Loosen the four fixing screws and remove the Cassette-up Compartment Lid.



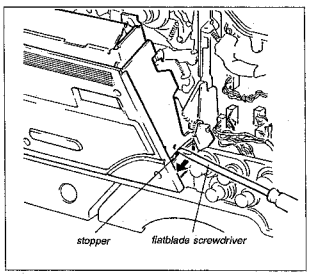
2. Remove the four fixing screws shown in the figure. Then move the Cassette-up Compartment in the direction of the arrows and remove it.



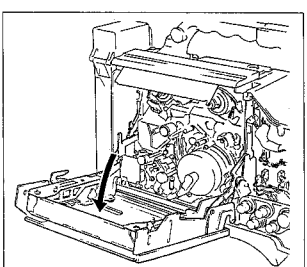
3-3. HOW TO FULLY OPEN THE CASSETTE-UP COMPARTMENT

The Cassette-up Compartment can be fully opened for tape movement area cleaning and heads cleaning.

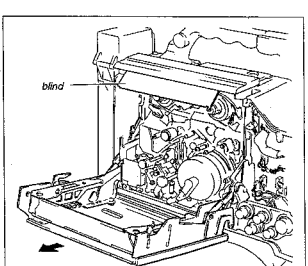
1. Put the unit into EJECT mode.
2. Release the stoppers by inserting the flatblade screwdriver into the groove on the left and right sides of the Cassette-up Compartment and moving it in the direction of the arrow as shown in the figure.



3. Then, the Cassette-up Compartment is fully opened.



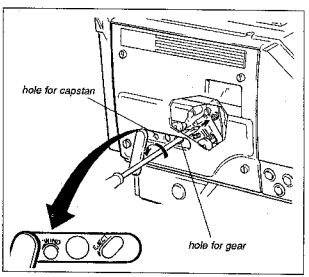
4. When installing the Cassette-up Compartment, close it while pulling the Cassette holder in the direction of the arrow and holding the blind of the unit.

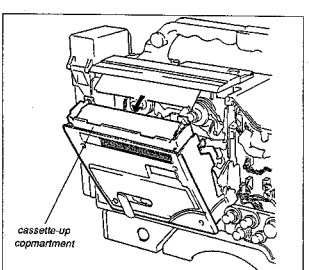


3-4. WHEN THE TAPE SLACKED IN THE UNIT, HOW TO REMOVE THE CASSETTE TAPE

1. Turn OFF the POWER switch.
2. Open the cover on the Cassette-up Compartment Lid.
3. While holding the Cassette-up Compartment by hand, insert the phillips type screwdriver into the hole for the gear shown in the figure and turn the gear about four times in the EJECT direction.
4. After detecting that the lock is released by hand, insert the screwdriver into the hole for capstan shown in the figure, and turn the Capstan in the WIND direction until the supply side Reel Table begin to rotate.
5. When the tape is wound into the cassette, pull out the screwdriver from the unit and release the hand from the Cassette-up Compartment.
6. Then, the cassette tape can be removed.

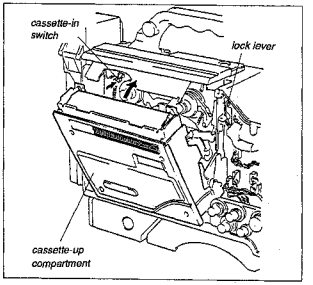
(NOTE) After remove the cassette tape, be sure to turn ON the POWER switch before close the Cassette-up Compartment.
If not, the Cassette-up Compartment is not locked, because the lock lever is not located in the normal position.





3-5. OPERATION OF THE UNIT WITHOUT THE CASSETTE TAPE

1. Put the unit into EJECT mode.
2. Open the Cassette-up Compartment fully. (Refer to Sec.3-3)
3. While pressing the Cassette-in switch, press the stopper of the lock lever with a pencil lead or similar object and lock the stopper.
4. After the movement of the Reel Chassis is completed, release the Cassette-in switch.
5. Press the desired function button.



3-6. EXTENSION BOARD

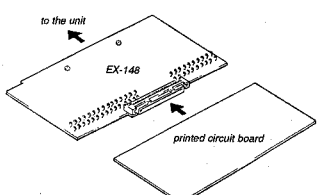
The plug-in type printed circuit boards listed below can be serviced by using Extension Board, EX-148.
Simply insert the Extension Board into the amplifier chassis and connect the circuit board to be serviced to the end of the Extension Board.

(NOTE) Be sure to turn OFF the POWER before inserting or removing the Extension Board or printed circuit boards.

Connectable printed circuit board

AT-49A	VP-24/P
IE-30/P	VDA-11/P
VA-104	AFM-6/P
PR-132A/AU	AU-97/P
EN-79U/P	SV-97A/AP
SG-152/AP	SY-117C/CP

DC-DC CONVERTER CD-89



3-7. NOTES FOR ADJUSTMENT OF THE PRINTED CIRCUIT BOARDS

(1) Power is supplied irrespective of POWER switch is turned OFF, because of back up of the time code data. When disconnecting the FL-57 flexible printed circuit board connected to the TC-48A/AP board, turn OFF the POWER switch, remove the battery and disconnect the calbe from the DC IN connetor.

(2) If the protect circuit of the DC-DC converter CD-89 is activated because of the short circuit of power circuit, turn OFF the POWER switch once, after a while, about more than one minute later, trun ON the POWER switch.

3-8. SERVICE OF THE PRINTED CIRCUIT BOARD

- **TC-48A/AP Board**

If the TC-48A/AP board is replaced, be sure to mount the nonvolatile memory (Ref. No. IC515) that is used in the unit before.

- **MB-317/P Board**

When replacing the MB-317/P board, remove the all plug in printed circuit board, and remove the upper and lower PC board guides.

- **BI-29, BI-30, BI-31 Boards**

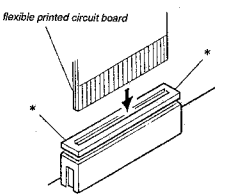
The BI-29, 30, 31 board on which the CCD is mounted had better not be removed. When removing it, the CCD is sometimes broken by the static electricity. If the CCD is brocken, the whole CCD unit must be replaced.

3-9. DISCONNECT AND CONNECT OF THE FLEXIBLE PRINTED CIRCUIT BOARD

1. Turn the POWER OFF, remove the battery and disconnect the DC IN connector.
2. Disconnect and install the flexible printed circuit board as shown in the figure.

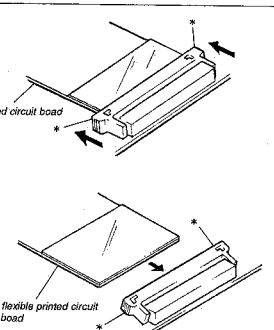
<Straight Type>
Disconnecting procedure
Pull up the * marked portions of connector, and pull out the flexible printed circuit board from the connector.

Installing procedure
Install the flexible printed circuit board as far as it will go until the line indicated on the flexible printed board, and push down the * marked portions of connector.



<Angle Type>
Disconnecting procedure
Slide the * marked portions of connector in the direction of the arrows, pull up the connector, and then disconnect the frexible printed circuit board from the connector.

Installing procedure
Pull up the * marked portions of the connector, insert the flexible printed circuit board on its contacting side is faced to the printed circuit board, and insert it as far as it will go untill the line indicated on the flexible board.
Push down the * marked portions, then slide it in the direction of the arrow to lock.



(NOTE) 1. Not install the flexible printed circuit board on a slant.
2. Not short the terminal of the flexible printed circuit board.

3-10. CAUTION FOR ELECTRICAL PART REPLACEMENT

3-10-1. Chip Parts Replacement Procedure

Tools: Soldering iron of 20W (Use a temperature controller, if possible, which can control the iron temperature to 270 ± 10°C)
Desoldering metal braid (Solder Wick or equivalent)
Solder (0.6 mm dia.)
Tweezers

Soldering Conditions: Tip temperature; 270 ± 10°C within the 2 seconds

1. To remove a resistor or capacitor, place the tip of a soldering iron on chip parts to heat the parts, and then move it horizontally for removal while being desoldered. For removal of a diode or transistor, heat the one side, with two pins, of chip parts at the same time, set the parts up when desoldered, and remove the two pins.
   And then, remove the pin on another side.
2. Absorb solder by using a desoldering metal braid to smooth the land surface of board after removal.
3. Confirm by visual check that no pattern of the removed chip parts is peeled off and no adjacent parts is damaged or bridged.
4. Perform a thin pretinning on the pattern.
5. Place new chip parts on the pattern to solder its both sides.

(NOTE)
- The chip part removed should not be used again.
- When mounting the new chip part, should not shift so that it not short.
- Use the soldering iron verticaly as much as possible.
- When mounting the new chip part, heat it from pattern side. Never contact the tip of the soldering iron to the part.

* When removing the IC, it is recommended that the following TECHNO DESIGN soldering iron be used.
  TOP-482 for SOP
  TOP-483 for QFP
  TOP-480 temperature controller
  for TOP-482,483

3-11. SPARE PARTS

1. The shaded ▒▒ and ⚠ marked components are critical to safety.
   Replace only with the same components as specified.

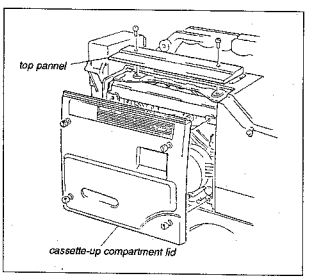
2. Replacement parts supplied from the Sony Parts Center will sometimes have a different shape and outside view from the parts which are used in the unit. This is due to "accommodating improved parts and/or engineering changes" or "standardization of genuine parts".
   - This manual's exploded views and electrical spare parts lists indicate the part numbers of "the present standardized genuine parts".
   - Regarding engineering part changes by our engineering department, refer to Sony service bulletins and service manual supplements.

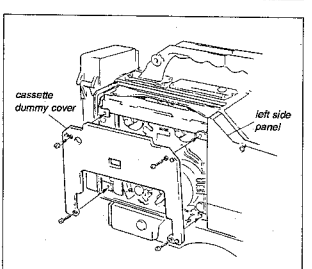
3. The parts marked with "s" in the SP column of the exploded views and electrical spare parts lists are normally stocked for replacement purposes. The parts marked with "o" in the SP column are not normally required for routine service work. Orders for parts marked with "o" will be processed, but allow for additional delivery time.

3-12. REMOVAL OF THE MECHANICAL DECK BLOCK

1. Put the unit into the threading end mode.
2. Remove the Top Panel.
3. Remove the Cassette-up Compartment Lid and install the Cassette Dummy Cover which is prepared for service.
4. Remove the Left Side Panel.
5. Remove the four screws which secure the mechanical deck block to the unit by using the hexagon bit (J-6326-120-A).
6. Remove the mechanical deck block from the unit while removing the connectors below on the mother board.
   Drum : CN41 and CN42
   FE-4 board : CN43
   TB-5 board : CN44

(NOTE) When installing the mechanical deck block, perform the tape run check or alignment in Section 6.





3-13. USE OF THE SERVO REMOTE CONTROL TOOL

For servo system alignment and mechanical alightment, it is recommended to use the SERVO REMOTE CONTROL TOOL (EW-229).

(1) Connection

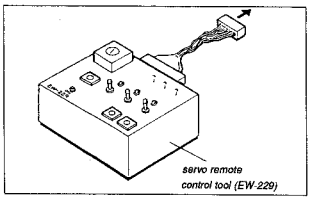
1. Connect the connector (14P, female) of the supplied harness to the tool.
2. Connect the other side of the connector of the harness to CN2/SV-97A/AP board of the VTR.

(2) Function of switches and test points

The desired mode can be obtained by push switches and rotary switch on the function control panel of this tool.

• TRCON switch
After the rotary switch is set to the "F" position, turn ON this switch. Then LED lights, tracking control is possible by pressing the "+" button or the "–" button.
When turned OFF, return the unit to the just tracking mode. The memory is cleared by disconnecting the connector of the tool from the CN2/SV-97A/AP board.

• SW POSITION switch
After the rotary switch is set to the "F" position, turn ON this switch. Then LED lights, the switching position is shifted by pressing the "+" button or the "–" button.



• REC SERVO switch
Extend the SV-97A/AP board by using the EX-148 extension board. After the rotary switch is set to the "F" postion, open or short the TP11/EX-148 board. Then the following mode is obtained.
- After the TP11/EX-148 board is opened, turn ON this switch. Then LED lights, the capstan servo circuit is put into the REC SERVO mode.
- After the TP11/EX-148 board is shorted with GND, turn ON this switch. Then LED lights, the unit is put into the back space editing alighnment mode.

• REV button
The unit is put into REV mode by pressing this button.
Press the STOP button on the VTR, the unit is put into the STOP mode.

• SW PULSE test terminal
The switching pulse signal is appeared at this test terminal.

• CTL test terminal
The CTL signal is appeared at this test terminal.

• Rotary switch
The mode described in the following table is obtained by setting the rotary switch to "0" through "F" positions. However the rotary switch is set to the same position, the different mode can be obtained by shorting between TP11/EX-148 board and GND. (In this mode, extract the SV-97A/AP board, and extend it with EX-148 extension board.)
When the rotary switch is set to the specified positions, it is neccessary to mute the slack detection circuit.
The slack detecion circuit can be muted by turning ON the S1/SY-117C/CP board.

Rotary Switch	TP11/ EX-148	Mode	For use
0	OPEN	Drum rotating. Capstan rotating. The CH-1 head of luminance or chrominance is selected.	Recording/playback is possible with the CH-1 head only of luminance or chrominance. This mode is used for check and adjustment to the CH-1 head for luminance or chrominance.
	Short with GND	Phase servo circuit of the drum is turned to OFF.	Check the servo system circuit.
1	OPEN	Drum rotating. Capstan rotating. The CH-2 head of luminance or chrominance is selected.	Recording/playback is possible with the CH-2 head only of luminance or chrominance. This mode is used for check and adjustment to the CH-2 head for luminance or chrominance.
	Short with GND	———	———
2	OPEN	Drum rotating. Capstan rotating. The CH-3 head of luminance or chrominance is selected.	Recording/playback is possible with the CH-3 head only of luminance or chrominance. This mode is used for check and adjustment to the CH-3 head for luminance or chrominance.
	Short with GND	———	———
3	OPEN	Drum rotating. Capstan rotating. The CH-4 head of luminance or chrominance is selected.	Recording/playback is possible with the CH-4 head only of luminance or chrominance. This mode is used for check and adjustment to the CH-4 head for luminance or chrominance.
	Short with GND	The capstan rotates at 1/6 times normal speed.	Check the CTL signal output at 1/6 times normal speed. (Before the check, mute the slack detection circuit.)
4	OPEN	Drum rotating is stopped. The switching pulse selects each channel. (Mute the slack detection circuit.)	
	Short with GND	The capstan rotates at three times normal speed.	Check the servo system circuit.

Rotary Switch	TP11/ EX-148	Mode	For use
5	OPEN	Drum rotating is stopped. The switching pulse selects the CH-1 head of luminance or chrominance. (Mute the stack detection circuit.)	
	Short with GND	———	———
6	OPEN	Drum rotating is stopped. The switching pulse selects the CH-2 head of luminance or chrominance. (Mute the stack detection circuit.)	
	Short with GND	———	———
7	OPEN	Drum rotating is stopped. The switching pulse selects the CH-3 head of luminance or chrominance. (Mute the slack detection circuit.)	
	Short with GND	———	———
8	OPEN	Drum rotating is stopped. The switching pulse selects the CH-4 head of luminance or chrominance. (Mute the slack detection circuit.)	
	Short with GND	———	———
9	OPEN	Capstan rotating is stopped in the PAUSE mode.	Tape path alignment (Before the alignment, mute the slack detection circuit.)
	Short with GND	———	———

Rotary Switch	TP11/ EX-148	Mode	For use
A	OPEN	———	———
	Short with GND	———	———
B	OPEN	———	———
	Short with GND	———	———
C	OPEN	———	———
	Short with GND	———	———
D	OPEN	The overlap is increased of 3H in each entrance and exit side.	Check the quantity of overlap.
	Short with GND	———	———
E	OPEN	The limit of the RF alarm detection is increased.	RF alarm alignment.
	Short with GND	———	———
F	OPEN	Normal mode.	———
	Short with GND	Normal mode.	———

3-14. MAINTENANCE TOOL

Part Number	Description	For use
J-6001-820-A	DRUM ECCENTRICITY GAUGE (3)	Upper drum eccentricity adjustment
J-6001-830-A	DRUM ECCENTRICITY GAUGE (2)	Upper drum eccentricity adjustment
J-6026-100-A	RESOLUTION CHART	Measurement of Pick-up Tube Response
J-6026-130-B	GRAY SCALE CHART	Measurement of Pick-up Tube Response
J-6029-140-A	PATTERN BOX, PTB-500	Camera System Alignment
J-6080-003-C	FWD BACK TENSION MEASUREMENT CASSETTE	FWD torque adjustment
J-6086-570-A	REFERENCE FLAT PLATE	Audio head zenith adjustment
J-6152-450-A	WIRE CLEARANCE CHECK GAUGE	Clearance check
J-6321-500-A	TAPE GUIDE ADJUSTMENT DRIVER	Tape path adjustment
J-6321-880-A	CASSETTE DUMMY COVER	Mechanical deck adjustment
J-6325-110-A	TORQUE DRIVER BIT (FOR M1.4)	Parts replacement
J-6325-360-A	FLATNESS CHECK TOOL	Assembling the frame
J-6325-380-A	TORQUE DRIVER BIT (FOR M2)	Parts replacement
J-6325-400-A	TORQUE DRIVER (FOR 3kg)	Parts replacement
J-6325-530-A	DRUM ECCENTRICITY GAUGE (6)	Upper drum eccentricity adjustment
J-6326-120-A	HEXAGON BIT	Removal of the mechanical deck block
J-6332-290-A	SERVO REMOTE CONTROL TOOL	Mechanical deck and servo system adjustment
J-6335-710-A	REC CURRENT ADJUSTMENT TOOL	REC current adjustment
J-6335-730-A	VIDEO SIGNAL INPUT BOARD	Video system adjustment
J-6335-740-A	EXTENSION HARNESS	Mechanical deck adjustment
7-732-050-20	TENSION SCALE (50g FULL SCALE)	Tension adjustment
7-723-902-00	INSPECTION MIRROR	Video Tracking Adjustment
8-960-096-01	ALIGNMENT TAPE, CR2-1B	TAPE Run Alignment
8-960-096-41	ALIGNMENT TAPE, CR5-1B	Video System Adjustment
8-960-097-37	ALIGNMENT TAPE, CR5-1A	Audio System Adjustment, TAPE Run Alignment

3-15. PRECAUTIONS ON TIGHTENING THE SCREWS

(1) The Fixing Screws to the Chassis

The BVW-400/400P is compact and lightweight, so many M1.4 x 2.5 screws (1.4mm dia.) and M2 x 5 and M2 x 8 screws (2mm dia.) are employed. A magne-diecast chassis is employed.

Pay careful attention to the tightening torque when tightening the screws. Stronger torque may damage the chassis screws. The torque screwdriver and bits below are provided.

Torque driver	J-6325-400-A
Bit for M1.4	J-6325-110-A
Bit for M2	J-6325-380-A

Screw M1.4 torque: 0.9 ± 0.1kg.cm
Screw M2 torque: 3.0 ± 0.5kg.cm

The above torque driver can be used for both screws M1.4 and M2.

If you damage the chassis screws when tightening screw M1.4, use the following screw:
M1.7 x 3 (2-641-348-02)
or
M1.4 x 5 (3-729-013-71)

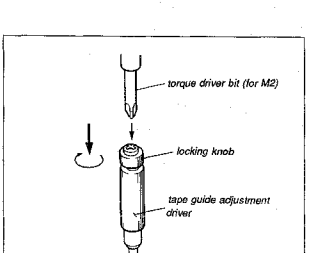
To distinguish the above screw from screw M1.4, mark the screw top in red. Apply the locking compound at the same time.

(2) The Locking Screw of the Tape Guide Upper Flange

When the height adjustment of the tape guide is performed in the Tape Run Alignment, use the tape guide adjustment driver (J-6321-500-A) prepared for the maintenance tool.
After the height adjustment of the tape guide is completed, tighten the locking screw of the tape guide upper flange with the torque driver by the following procedures.

Torque Driver	J-6325-400-A
Torque Driver Bit (For M2)	J-6325-380-A
Tightening Torque	0.9 ± 0.1 kg.cm

(a) Set the torque driver bit (for M2) on the torque driver.
(b) Set the torque driver on the screw at the top of the locking knob of the tape guide adjustment driver.
(c) Push down the torque driver and turn it clockwise.



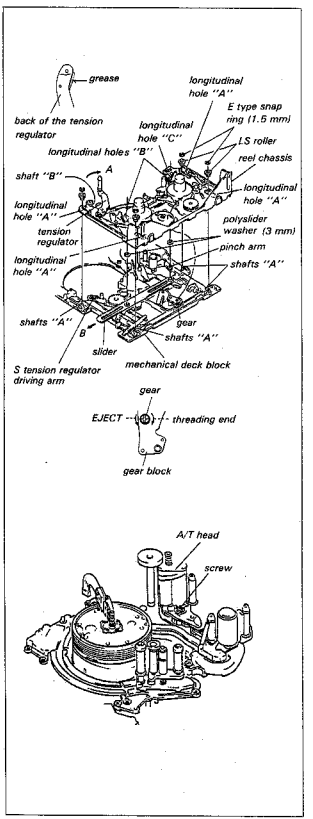
3-16. INSTALLATION OF THE REEL CHASSIS

- When removing or installing the Reel Chassis, remove the Mechanical Deck Block from the unit. (Refer to Sec. 3-12. Removal of the Mechanical Deck Block.) The following is the procedure for installation of the Reel Chassis.

Tool: Sony grease
Sony oil
Mode: EJECT

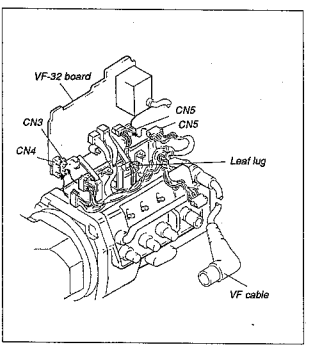
Installation procedure:

(1) Smear Sony grease on the back of the Tension Regulator of the Reel Chassis Assembly as shown in the figure.
(2) Gently push the Tension Regulator Arm in the direction of the arrow A.
(3) Apply a 1/4 drop of Sony oil on each of the four shafts "A" of the Mechanical Deck Block.
(4) Move the slider in the direction of the arrow B fully by hand.
(5) Insert 3mm diameter polyslider washers (0.5mm thick) (3-701-439-21) onto the two shaft of the slider.
(6) Insert the Reel Chassis in the direction shown in the figure so that the gear is not contact with the reel chassis.
  (i) Insert the four shafts "A" of the Mechanical Deck Block into the four longitudinal holes "A" of Reel Chassis.
  (ii) Insert the two longitudinal holes "B" onto the two shafts of the Reel Chassis.
  (iii) Insert the longitudinal hole "C" of the Reel Chassis onto the Pinch Arm Roller.
  (iv) Insert the shaft "B" of the Reel Chassis into the longitudinal hole of the S Tension Regulator Driving Arm.
(7) Insert the LS Roller (3-723-007) onto the four shafts "A" of the Mechanical Deck Block as shown in the figure. Fasten with the E type stop ring (1.5mm).
(8) Turn the screw on the front of the A/T Head by the screwdriver, and repeat threading and unthreading two or three times and check that they can be done smoothly.

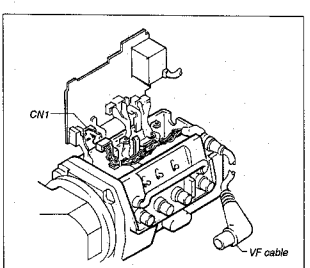


3-17. ARRANGEMENT OF THE VF HARNESS

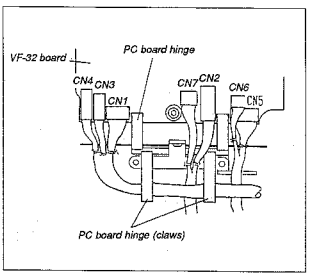
1. Place the VF connector as shown in the figure, and arrange them on the harness of the Leaf Lug and then, connect the connectors CN3, CN4 and CN5 to the VF-32 board.



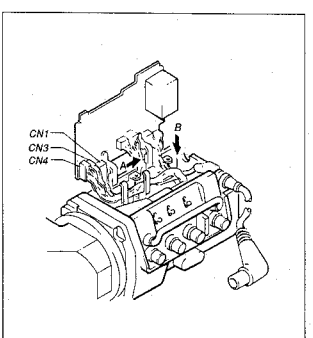
2. Connect CN1 of the VF cable to the VF-32 board.



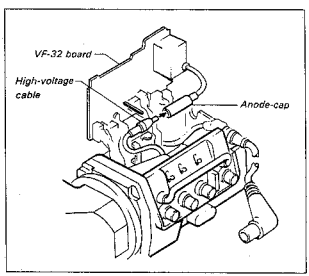
3. Arrange the harness of the CN2, CN6, and CN7 as shown in the figure, and push the harness of the CN1, CN3 and CN4 into the claws of the PC Board Hinge.



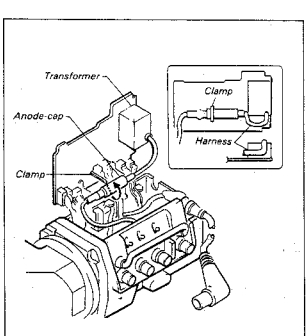
4. Gather the slackening of the harness of CN1, CN3 and CN4 in the direction of the arrow A and push into them in the direction of the arrow B.



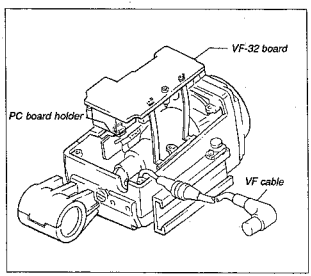
5. Insert the high-voltage cable from the CRT to the anode-cap of the VF-32 as far as locked.
(Be free the high-voltage cable from the other harness.)



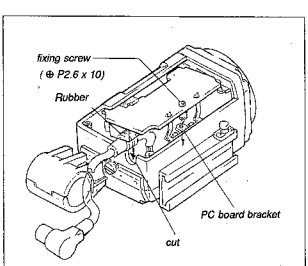
6. Clamp the anode-cap with the clamp of the VF-32 as shown in the figure and arrange it on side of the transformer.



7. Place the VF cable as shown in the figure and install the VF-32 board on the PC Board Holder.



8. Install the VF cable as shown in the figure, and close the VF-32 board. Then tighten the Board with the supplied fixing screws.



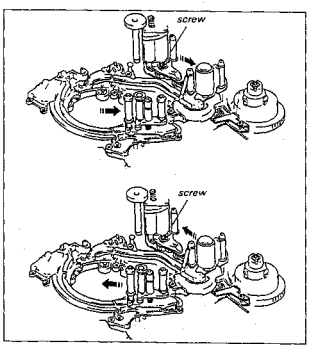
SECTION 4
REPLACEMENT OF THE MAJOR PARTS

PRECAUTIONS WHEN REPLACING PARTS

1. The mode of the unit when replacing parts is described in the Parts Replacement. The following is the description of the modes.

- EJECT: In this mode, the Pinch Roller, Tension Regulator Arm, T Base, and S Base have all completely returned to the reel table side.
  This condition can be set by turning the screw shown in the figure counterclockwise.

- Threading end:
  In this mode the Pinch Roller is placed in front of the Capstan Shaft, the T Base and S Base are in the positions of the T Support Bracket and S Support Bracket, and the Tension Regulator Arm is completely open.
  This condition can be set by turning the screw shown in the figure clockwise.



2. Replace parts with the VTR installed onto the unit, unless otherwise specified. At that time, open the Cassette-up Compartment fully. (Refer to Section 3-3).

3. The polyslider washers used to fix parts should not be used again once they have been removed. Use a new one after replacement.
   When installing a polyslider washer to the shaft, push the polyslider washer until the space between it and the part is about 0.1 to 0.2mm.
   1.2mm diameter polyslider washer:
   3-559-448-11
   1.5mm diameter polyslider washer:
   3-321-813-01

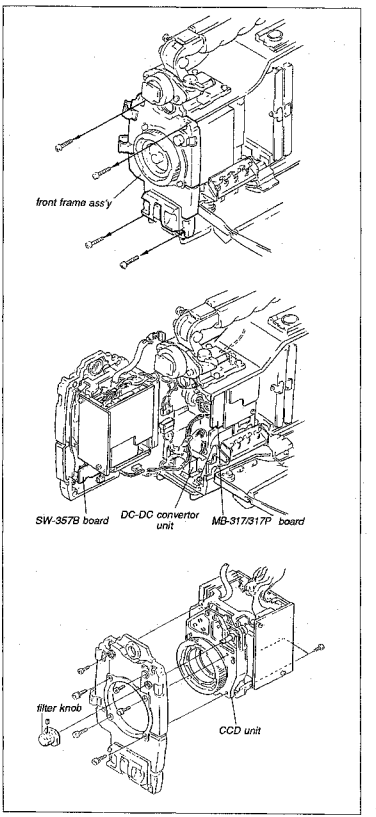
4. When tightening screws, be sure to keep the tightening torque. The torque driver and bits are provided.
   J-6325-400-A Torque driver (for 3kg)
   J-6325-110-A Torque driver bit (for M1.4)
   J-6325-380-A Torque driver bit (for M2)

   Tightening torque
   1.4mm dia.screw: 0.9 ± 0.1kg.cm
   2mm dia.screw: 3 ± 0.5kg.cm

4-1. REPLACEMENT OF THE CCD UNIT

Replacement procedure:

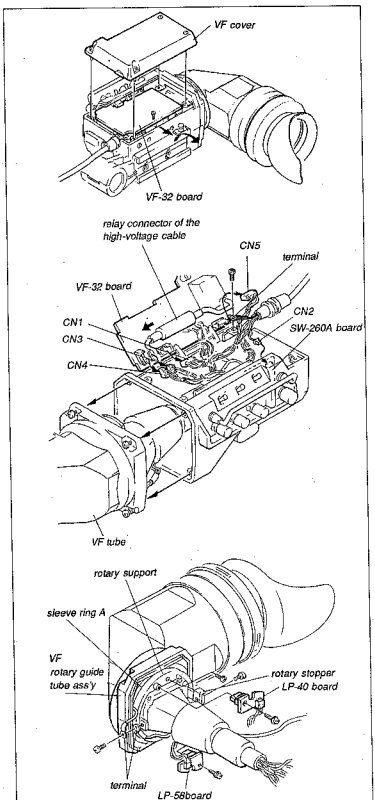
(1) Remove the panels. (Refer to Section 3-1.)
(2) Remove the Viewfinder.
(3) Remove the four screws fixing the Frout Frame Ass'y to the unit.
(4) Disconnect the connectors CN1 and CN2 on the SW-357B Board, CN110 on the DC-DC convertor unit and CN51, CN52, CN53, CN55, CN57, CN62 on the MB-317/317P Board as shown in the figure.
(5) Remove the two fixing screws from the front side of the Front Frame, remove the two fixing screws from the rear side of the Front Frame.
(6) Loosen the set screw by the hexagonal screwdriver and remove the Filter Knob.
(7) Remove the four hexagonal headed screws hole bolt and remove the CCD Unit from the Front Frame.
(8) Assemble the CCD Unit by reversing the steps (1) to (7)



4-2. REPLACEMENT OF THE CRT ASS'Y

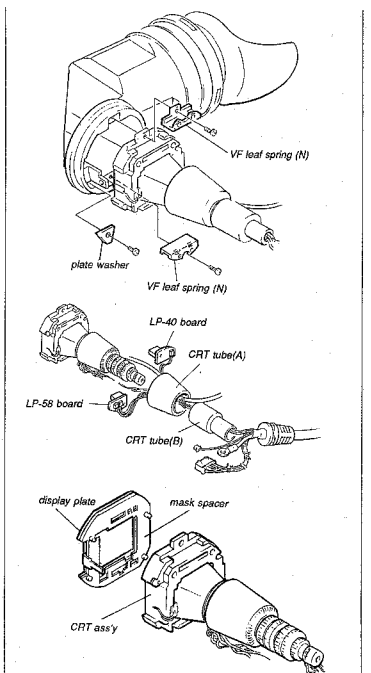
Replacement procedure:

(1) Loosen the four fixing screws and remove the VF Cover.
(2) Loosen the screws fixing the VF-32 Board, and open the VF-32 Board while moving it in the direction of the arrows as shown in the figure.
(3) Disconnect the connectors CN1, CN3, CN4, CN5 on the VF-32 Board and disconnect CN2 on the SW-260A board. Remove the screw fixing the terminal.
Disconnect the relay connector of the High-voltage Cable.
(4) Loosen the four fixing screws and remove the VF Tube together with the VF cable from the VF Unit.
(5) Remove the two screws fixing the LP-40 and LP-58 Boards.
(6) Remove the two screws fixing the Rotary Support.
(7) Remove the two screws fixing the Rotary Stopper and two terminals.
Then remove the Rotary Support and Sleeve Ring A and VF Rotary Guide Tube Ass'y.
(8) Remove the two screws fixing the VF Leaf Spring (N) and the screw fixing the plate washer. Then pull out the CRT Assembly.
(9) Remove the CRT Tube (A) and (B) and remove the LP-40 and LP-58 Boards.
(10) Peel away the Mask Spacer with Display plate from the CRT Ass'y.
(11) Put the Mask Spacer with Display plate which removed form the old CRT Ass'y on the new CRT Ass'y with a adhesive tape.



(12) Assemble the CRT Ass'y by reversing the steps for removal.

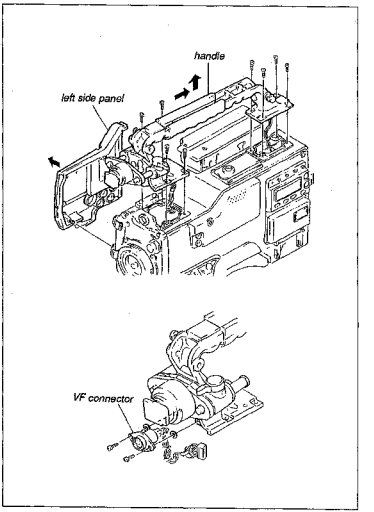
(NOTE) When installing the CRT Ass'y, be careful of arrangement of harnesses. Wrong arrangement damages the harness when the Viewfinder is in use. Connect the relay connector of the High-voltage Cable tightly.



4-3. REPLACEMENT OF THE VF CONNECTOR

Replacement procedure:

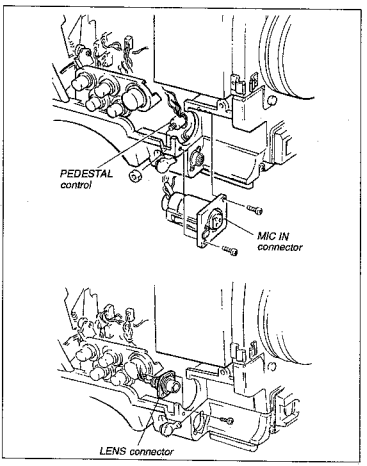
(1) Open the Cassette-up Compartment Lid (put the unit into EJECT mode), remove the left side panel.
(2) Move the Viewfinder forwards.
(3) Remove the fixing screws shown in the figure and remove the handle.
(4) Remove the two screws fixing the VF connector onto the handle and disconnect the CN50 on the MB-317/317P Board, then remove the VF connector with the harnesses.
(5) Assemble the VF connector by reversing steps for removal.



4-4. REPLACEMENT OF THE LENS CONNECTOR

Replacement procedure:

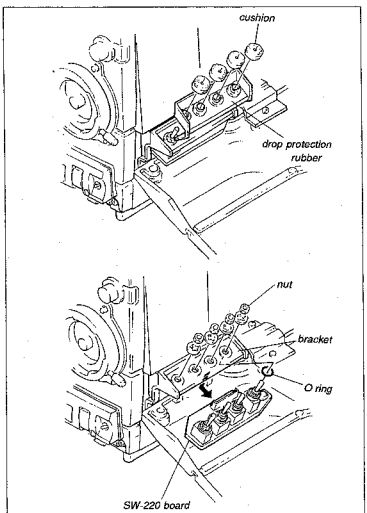
(1) Open the Cassette-up Compartment Lid (put the unit into EJECT mode), remove the left side panel.
(2) Remove the two fixing screws and disconnect the CN25 on the MB-317/317P Board, and then remove the MIC IN connector.
(3) Disconnect the CN22 on the MB-317/317P Board and remove the PEDESTAL control.
(4) Remove the two fixing screws and disconnect the CN58 on the MB-317/317P Board, and then remove the LENS connector.
(5) Assemble the new LENS connector by reversing steps for removal.



4-5. REPLACEMENT OF THE FUNCTION SWITCH

Replacement procedure:

(1) Open the right side panel.
(2) Remove the cushions of each switch.
(3) Remove the Drop Protection Rubber.
(4) Remove the nuts fixing the swiches by the nut driver.
(5) Remove the SW-220 Board in the directions of the arrow in the figure.
(6) Remove the defective switch from the SW-220 Board and replace the new switch.
(7) Confirm that the O Ring is installed between each switch and the bracket, then, assemble the switch by reversing steps for removal. (O Ring is supplied with switch.)

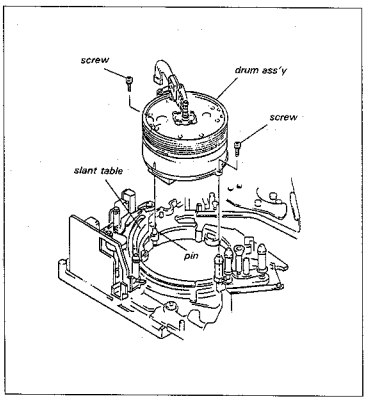


4-5. REPLACEMENT OF THE DRUM ASSEMBLY

- When replacing the Drum Assembly, careful not to touch the Video Head.

Tool: Tweezers
Mode: EJECT
Replacement procedure:

(1) Disconnect the flexible board (FL-54 Board) of the Slip Ring which is connected to CN5 on the TB-5 Board with tweezers. (Refer to Section 3-9.)
(2) Remove the two fixing screws of the Drum Assembly and remove the Drum Assembly from the unit. When removing, raise the Drum Assembly straightly up so that disconnect the connectors CN41 and CN42 at the bottom of the drum which are inserted into the mother board (MB-317/317P Board).
(3) Install the new Drum Assembly in the unit so that the Slant Table Pin is installed into the hole of the new Drum Assembly.
(4) Tighten the fixing screw at the Reel Table side of the Drum Assembly, then tighten the fixing screw at the CTL Head side.
(5) Insert and lock the flexible board (FL-54 Board) of the slip Ring into connector CN5 on the TB-5 Board with tweezers. (Refer to Section 3-9.)
(6) After replacement, perform the adjustments in Section 4-42.



4-7. REPLACEMENT OF THE UPPER DRUM ASSEMBLY

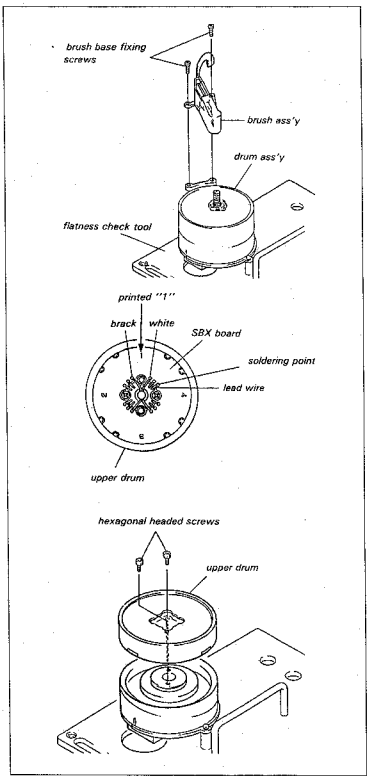
• When replacing the Upper Drum Assembly, be careful not to touch the Video Head.

Tool: Flatness check tool
Drum eccentricity gauge (3)
Drum eccentricity gauge (2)
Drum eccentricity gauge (6)
Tweezers
L-shaped hexagonal wrench (across flat has 1.5mm)

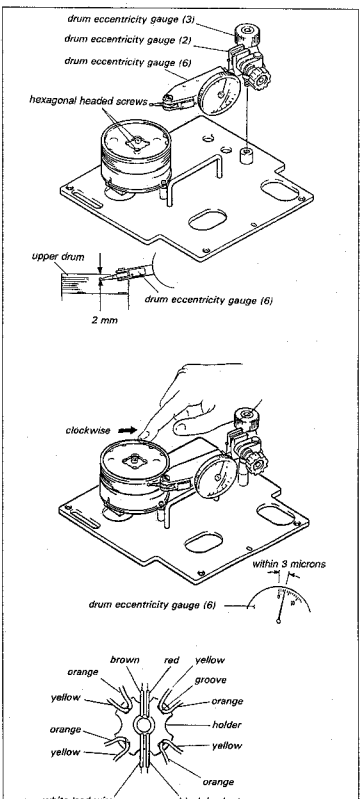
Mode: EJECT

Replacement procedure:

(1) Remove the Drum Assembly from the unit as described in Steps (1) and (2) in Section 4-6.
(2) Install the Drum Assembly on the flatness check tool.
(3) Remove the two brush base fixing screws and remove the Brush Assembly from the Drum Assembly.
(4) Remove the two hexagonal headed screws from the Upper Drum Assembly with the L-shaped hexagonal wrench, then remove the Upper Drum Assembly from the Drum Assembly.
(5) Remove the Slip Ring Assembly from the removed Upper Drum Assembly as described in Section 4-8.
(6) Put the new Upper Drum Assembly on the flange.
(7) Thread the hexagonal headed screws on the new Upper Drum Assembly to the flange snugly but do not tighten.



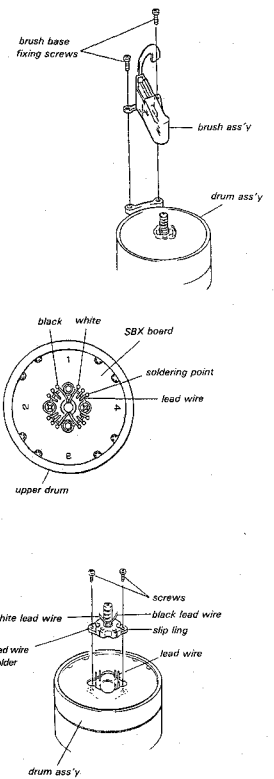
(8) Assemble the drum eccentricity guages (3),(2),(6), and install them on the flatness check tool.
(9) Adjust the position of gauge so that the tip probe is positioned at the point about 2mm from the top edge of the Upper Drum.
(10) Turn the Upper Drum Assembly slowly clockwise and confirm that the pointer deflection of the gauge is within 3 microns during one complete turn.
If the specification is satisfied, perform Step (12) and later. If not, Perform Step (11) and later.
(11) To satisfy the specification, adjust the position of the upper drum assembly by moving it manually.
(12) After adjustment, alternately tighten the two hexagonal headed screws.
(13) Confirm that the specification is satisfied once again.
(14) Install the Slip Ring Assembly removed in Step (5) as described in Section 4-8.
(15) Install the Brush Assembly.
(16) Perform the Brush Position Adjustment in Section 6-16-1.
(17) Remove the Drum Assembly from the flatness check tool.
(18) Perform steps (3) through (6) in Section 4-6.

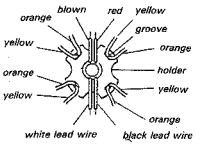


4-8. REPLACEMENT OF THE SLIP RING ASSEMBLY

Tool: Tweezers
Mode: EJECT
Replacement procedure:

(1) Disconnect the flexible board (FL-54 Board) of the slip ring which is connected to CN5 on the TB-5 Board with tweezers. (Refer to Section 3-9.)
(2) Remove the two brush base fixing screws and remove the Brush Assembly from the unit.
(3) Desolder the four lead wires of the Slip Ring from the SBX Board of the Upper Drum Assembly.
(4) Remove the other eight lead wires from the lead wire holder.
(5) Remove the two screws of the Slip Ring, then remove the Slip Ring from the unit.
(6) Arrange the black and white lead wires of the new Slip Ring so that they are facing the side of the SBX Board with the silk screen printed "1", and put on the Drum Assembly. At that time, insert the eight lead wires removed in Step (4) into the four grooves of the lead wire holder as shown in the figure.
(7) Install the Slip Ring onto the Drum Assembly with the two screws.
(8) Solder the twelve lead wires on the SBX Board as shown in the figure.
(9) Install the Brush Assembly.
(10) Perform the Brush Position Adjustment in Section 6-16-1.
(11) Install and lock the flexible board (FL-54 Board) of the Slip Ring into CN5 on the TB-5 Board with tweezers. (Refer to section 3-9.)




orange
blown
red
yellow
groove
yellow
orange
orange
holder
yellow
yellow
orange
white lead wire
black lead wire

4-9. REPLACEMENT OF THE TAKE-UP SIDE REEL TABLE

Mode: EJECT

Replacement:

(1) Remove the Brake Slider refering to Section 4-17.

(2) Remove the polyslider washer at the top of the T Reel Table.

(3) Release the pressures of the T Sub Soft Brake and T Soft Brake from the T Reel Table while pressing them in the direction of the arrows, and remove the T Reel Table from the unit.

(4) Clean the reel shaft with a cleaning piece moistened with cleaning fluid.

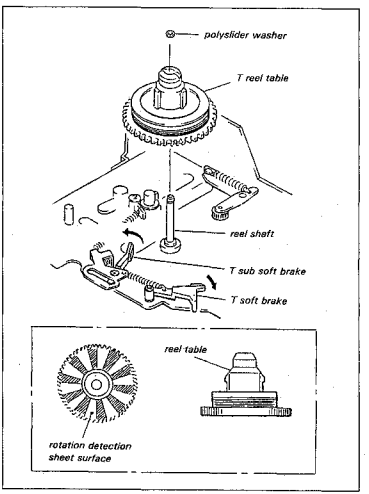
(5) Clean the Rotation Detection Sheet surface of the new T Reel Table and the reel table's outer circumference with a cleaning piece moistened with cleaning fluid.

(6) Release the T Sub Soft Brake and T Soft Brake as in Step (3), insert the T Reel Table onto the Reel Shaft, and fasten it with the 1.2mm diameter polyslider washer.

(7) While releasing the T Sub Soft Brake, rotate the T Reel Table by hand to check that it rotates smoothly.

(8) Install the Brake Slider refering to Section 4-17.

(9) After replacement, while releasing the T Soft Brake and T Sub Soft Brake, rotate the T Reel Table, and check that it rotates smoothly.

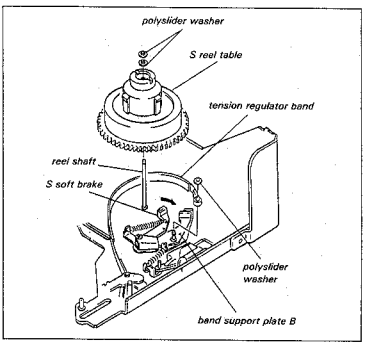


4-10. REPLACEMENT OF THE SUPPLY SIDE REEL TABLE

Mode: EJECT

Replacement procedure:

(1) Remove the polyslider washer (shown in the figure) fixing the Tension Regulator Band.
(2) Remove the polyslider washer at the top of the S Reel Table.
(3) Release the pressure of the S Soft Brake from the S Reel Table while pressing it in the direction of the arrow, and remove the S Reel Table from the unit.
(4) Clean the reel shaft with a cleaning piece moistened with cleaning fluid.
(5) Clean the Rotation Detection Sheet surface of the a new S Reel Table and the reel table's outer circumference with a cleaning piece moistened with cleaning fluid.
(6) Release the S Soft Brake as in Step (3), insert the S Reel Table onto the reel shaft, and fasten it with the 2mm diameter polyslider washer and the 1.2mm diameter polyslider washer.
(7) Insert the Tension Regulator Band onto the shaft of the Band Support B Assembly and fasten it with the 1.2mm diameter polyslider washer.
(8) After replacement, while releasing the S Soft Brake, rotate the S Reel Table by hand to check that it rotates smoothly.
(9) After replacement, perform the adjustments in Section 4-42.

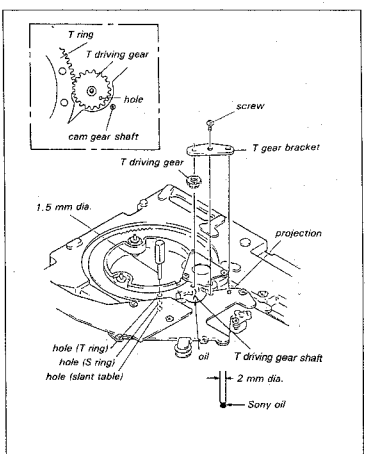


4-11. REPLACEMENT OF THE TAKE-UP SIDE DRIVING GEAR

- When replacing the T Driving Gear, remove the Mechanical Deck Block from the unit. (Refer to Section 3-12.)

Tool: 1.5mm diameter rod
Mode: EJECT
Replacement procedure:

(1) Remove the Mechanical Deck Block from the unit. (Refer to Section 3-12.)
(2) Remove a fixing screw of the T Gear Bracket and remove the T Gear Bracket and T Driving Gear from the back of the Mechanical Deck Block.
(3) Clean the T Driving Gear Shaft with a cleaning piece moistened with cleaning fluid.
(4) Apply a half drop of Sony oil on the above shaft. (One drop of Sony oil is about amount that remains on the tip of 2mm diameter rod dipped in oil.)
(5) Align the three holes (1.5mm dia.) of the Threading Ring (take-up side), Threading Ring (supply side), and Slant Table, then pass a rod (1.5mm dia.) through the holes.
(6) Insert the T Driving Gear onto the shaft so that the positional relationship between the T Driving Gear hole and Cam Gear Shaft are aligned as shown in the detail figure.
(7) Install the T Gear Bracket with a fixing screw.
(8) Repeat threading and unthreading two or three times and check that they can be done smoothly.

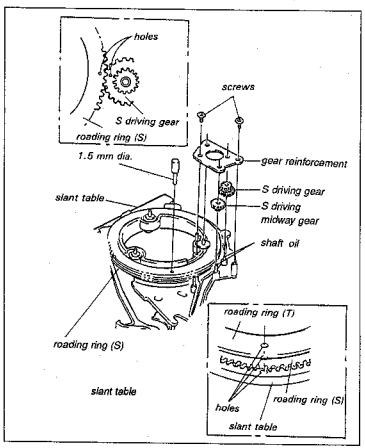


4-12. REPLACEMENT OF THE SUPPLY SIDE DRIVING GEAR

- When replacing the S Driving Gear, remove the Mechanical Deck Block from the unit. (Refer to Section 3-12.)

Tool: 1.5mm diameter rod
Mode: EJECT
Replacement procedure:

(1) Remove the Mechanical Deck Block from the unit. (Refer to Section 3-12.)
(2) Remove the two fixing screws of the Gear Reinforcement, and then remove the Gear Reinforcement, S Driving Midway Gear, and S Driving Gear from the back of the Mechanical Deck Block.
(3) Clean the S Driving Midway Gear and S Driving Gear Shafts with a cleaning piece moistened with cleaning fluid.
(4) Apply a half drop of Sony oil on the above two shafts.
(5) Align the three holes (1.5mm dia.) of the Threading Ring (take-up side), Threading Ring (supply side), and Slant Table, then pass one rod (1.5mm dia.) through the holes.
(6) Insert the S Driving Gear onto the shaft so that the positional relationship between the S Driving Gear hole and Threading Ring (supply side) hole are aligned as shown in the detail figure.
(7) Insert the S Driving Midway Gear and install the Gear Reinforcement with two fixing screws.
(8) Repeat threading and unthreading two or three times and check that they can be done smoothly.

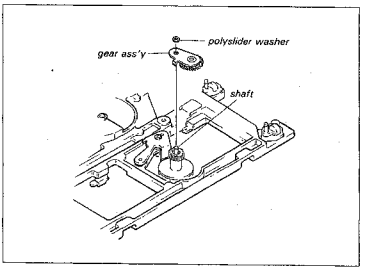


4-13. REPLACEMENT OF THE GEAR ASSEMBLY

Mode: EJECT

Replacement procedure:

(1) Remove the polyslider washer at the top of the Gear Assembly.
(2) Clean the shaft of the Gear Assembly with a cleaning piece moistened with cleaning fluid.
(3) Insert the new Gear Assembly onto the shaft, push a polyslider washer onto the shaft, and fasten the Gear Assembly.
(4) Perform the PLAY, F.FWD, and REW operations two or three times and check that they can be done smoothly.
(5) After replacement, perform the Gear Assembly Position Adjustment in Section 5-1.



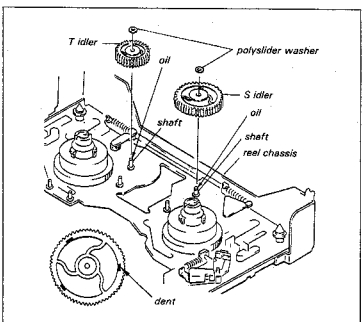
4-14. REPLACEMENT OF THE SUPPLY/TAKE-UP SIDE IDLER

- Since the S and T Idlers are replaced in the same manner, only replacement of the S Idler is described below.

Mode: EJECT

Replacement procedure:

(1) Remove the polyslider washer and remove the S Side Idler from the unit.
(2) Clean the Reel Shaft with a cleaning piece moistened with cleaning fluid.
(3) Apply a 1/4 drop of Sony oil on the shaft.
(4) As shown in the figure, install the S Idler in the unit with the S Idler surface's three dents faced to the reel chassis (the lower position).
(5) Fasten the S Idler with the 1.2mm diameter polyslider washer.

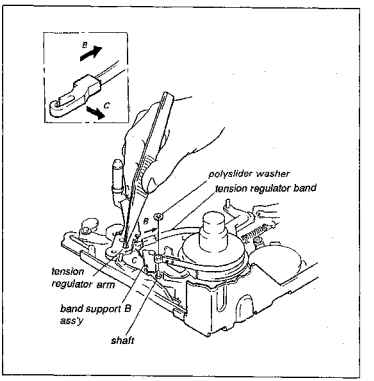


4-15. REPLACEMENT OF THE TENSION REGULATOR BAND

- When replacing the Tension Regulator Band, be careful not to touch or bend the band felt portion.

Tool: Tweezers
Mode: Theading end
Replacement procedure:

(1) Put the unit into the threading end mode. (Refer to the Precautions when Replacing Parts.)
(2) Remove the polyslider washer shown in the figure.
(3) Push the Arm Hook of the Tension Regulator Band in the opposite direction of the arrow B.
(4) Insert twezzers into the hole of the Tension Regulator Arm shown in the figure, and hold the hook and push it in the direction of the arrow C, then remove the Tension Regulator Band.
(5) Insert the hook of a new Tension Regulator Band into the lower portion of the Tension Arm in the direction indicated by the figure and push the hook in the opposite direction of the arrow C to lock it to the pin.
(6) Pull the hook of the Tension Regulator band in the direction of the arrow B.
(7) Taking care not to bend the Tension Regulator Band , wind it around the S Reel.
(8) Insert another hook of the Tension Regulator Band onto the shaft of the Band Support B Assembly and fasten it with 1.2mm diameter polyslider washer onto the shaft.
(9) After replacement, perform the adjustments in Section 4-42.



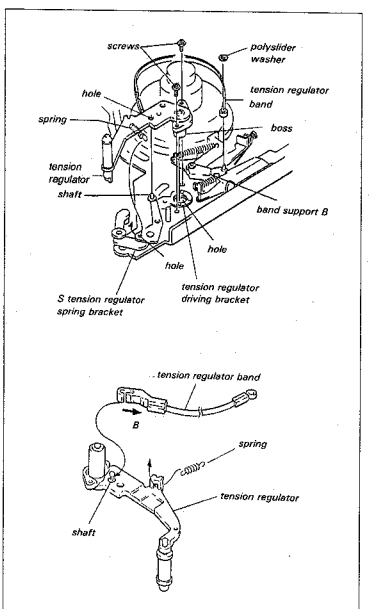
4-16. REPLACEMENT OF THE TENSION REGULATOR

- When replacing the Tension Regulator, remove the Tension Regulator Band from the unit. Be careful not to touch or bend the band felt portion.

Mode: EJECT

Replacement procedure:

(1) Remove the polyslider washer fixing the Tension Regulator Band.
(2) Remove the spring shown in the figure from the S Tension Regulator Spring Bracket.
(3) Remove the two fixing screws of the Tension Regulator and remove the Tension Regulator from the unit.
(4) Remove the spring (removed in Step (2)) from the removed Tension Regulator and install it on the new Tension Regulator in the direction as shown in the figure.
(5) Remove the Tension Regulator Band from the removed Tension Regulator and install it on the new Tension Regulator in the direction shown in the figure. After installation, pull the band in the direction of the arrow B.
(6) Align the hole of the Tension Regulator Driving Bracket with the reel chassis hole.
(7) Insert the Tension Regulator Boss into the reel chassis hole. Adjust the Tension Regulator position so that the Driving Bracket Shaft is inserted into the illustrated hole of the Tension Regulator.
(8) Install the Tension Regulator with the two screws.
(9) Install the spring (removed in Step (2)) on the S Tension Regulator Spring bracket in the direction as shown in the figure.
(10) Being careful not to bend the Tension Regulator Band, wind it around the S Reel.
(11) Insert the other hook of the band onto the shaft of the Band Support B Assembly and insert the 1.2mm diameter polyslider washer onto the shaft.
(12) After replacement, perform the adjustments in Section 4-42.

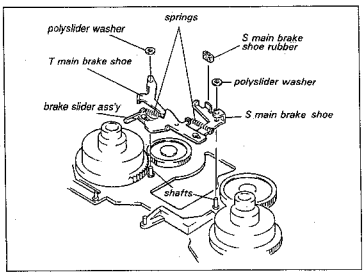


4-17. REPLACEMENT OF THE MAIN BRAKE SHOE

Mode: EJECT

Replacement procedure:

(1) Remove the T or S Brake Shoe Rubber.
(2) Install the new Brake Shoe Rubber.

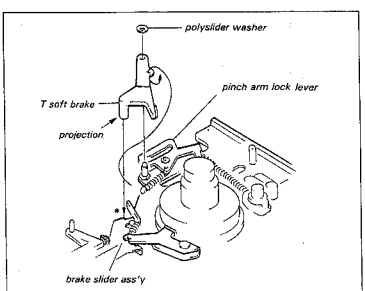


4-18. REPLACEMENT OF THE TAKE-UP SIDE SOFT BRAKE

Mode: EJECT

Replacement procedure:

(1) Remove the spring from the Pinch Arm Lock Lever which is hooked to the T Soft Brake.
(2) Remove the polyslider washer and remove the T Soft Brake from the unit.
(3) Install the T Soft Brake to the unit so that the projection of the new T Soft Brake is positioned to the * marked portion of the Brade Slider Assembly, insert the 1.2mm diameter polyslider washer onto the shaft, and fasten the T Soft Brake.
(4) Hook the spring of the Pinch Arm Lock Lever to the T Soft Brake.

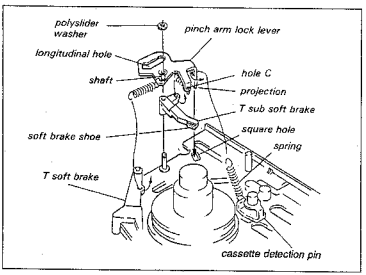


4-19. REPLACEMENT OF THE TAKE-UP SIDE SUB SOFT BRAKE

Mode: EJECT

Replacement procedure:

(1) Remove the spring from the Pinch Arm Lock Lever which is hooked to the T Soft Brake.
(2) Remove the spring from the Cassette Detection Pin which is hooked to the Pinch Arm Lock Lever.
(3) Remove the polyslider washer fixing the Pinch Arm Lock Lever and remove the Lock Lever from the unit.
(4) Remove the spring from the T Sub Soft Brake which is hooked on hole C of the Pinch Arm Lock Lever.
(5) Remove the spring from the T Sub Soft Brake and hook it on the new T Sub Soft Brake in the direction as shown in the figure.
(6) Insert the T Sub Soft Brake onto the shaft of the Pinch Arm Lock Lever and hook the spring as shown in the figure.
(7) Install the Pinch Arm Lock Lever on the unit so that the projection of the Pinch Arm Lock Lever is inserted into the Square hole of the reel chassis, the T Sub Soft Brake Shoe touches the reel table, and the Pinch Arm Roller is inserted into the longitudinal hole of the Lock Lever.
(8) Insert the 1.2mm diameter polyslider washer onto the shaft and fasten the Lock Lever.
(9) Hook the spring which is removed in Steps (1) and (2).

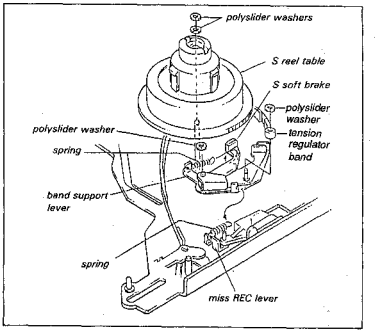


4-20. REPLACEMENT OF THE SUPPLY SIDE SOFT BRAKE

Mode: EJECT

Replacement procedure:

(1) Remove the polyslider washer (shown in the figure) fixing the Tension Regulator Band.
(2) Remove the polyslider washer at the top of the S Reel Table.
(3) Remove the S Reel Table from the unit while releasing the pressure against the S Reel Table of the S Soft Brake.
(4) Remove the spring from the Miss REC Lever B hooked on the Band Support Lever.
(5) Remove the polyslider washer shown in the figure and remove the Band Support Lever from the unit.
(6) Remove the spring from the S Soft Brake.
(7) Install the new S Soft Brake and hook the spring removed in Step 4 in the direction as shown in the figure.
(8) Assemble the S Soft Brake by reversing the Steps (1) through (5).



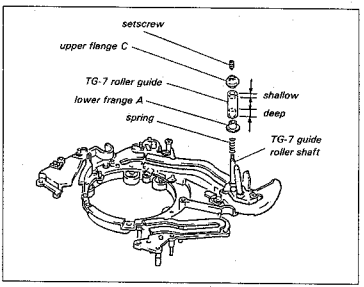
4-21. REPLACEMENT OF THE COMPONENT PARTS OF TAKE-UP SIDE BASE

- Replacement of the TG-7 (guide roller) on the T Base differs from replacement of the other components.
- Refer to Section 4-21-1 for replacement the TG-7, and refer to Section 4-21-2 for other components.

4-21-1. Replacement of the TG-7

Tool: Tape guide adjustment screwdriver
Mode: EJECT
Replacement procedure:

(1) Loosen the setscrew at the top of the TG-7 with the tape guide adjustment screwdriver.
(2) Remove the Upper Flange C.
(3) Remove the TG-7 Roller Guide TG-7, the Lower flange A, and the compression spring.
(4) Clean the TG-7 Guide Roller Shaft with a cleaning piece moistened with cleaning fluid.
(5) Insert the compression spring removed in Step (3) onto the TG-7 Guide Roller Shaft.
(6) Carefully insert the Lower Flange A and TG-7 Guide Roller onto the TG-7 Guide Roller Shaft in the direction as shown in the figure.
(7) Install the Upper Flange C.
(8) Tighten the setscrew at the top of the guide with the tape guide adjustment screwdriver.
(9) After replacement, perform the adjustments in Section 4-42.



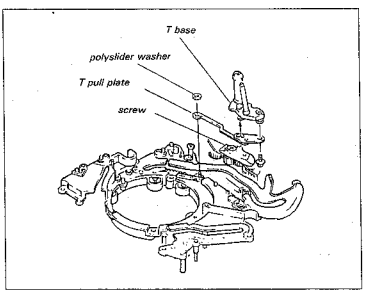
4-21-2. Replacement of the Component Parts of the Take-up Side Base

- For replacement of the TG-7 on the T Side Base, refer to Section 4-21-1.
- When replacing the components other than TG-7 on the T Side Base, remove the Drum from the unit once so as not to damage it.

Mode: Turn the screw shown in the figure so that the Take-up Side Base reaches the end of the Take-up Side Rail (I).

Replacement procedure:

(1) Remove the Drum Assembly from the unit. (Refer to Section 4-6.)
(2) Turn the screw and set the Take-up Side Base in the position described above.
(3) Remove the Take-up Side Rail(I). (Refer to Section 4-43.)
(4) Remove the polyslider washer fixing the Take-up Side Pull Plate and remove the Take-up Side Base from the unit.
(5) Replace the faulty component which constitutes the Take-up Side Base.
(6) Assemble the Take-up Side Base by reversing the Steps (1) through(4).
(7) After replacement, perform the adjustments in Section 4-42.



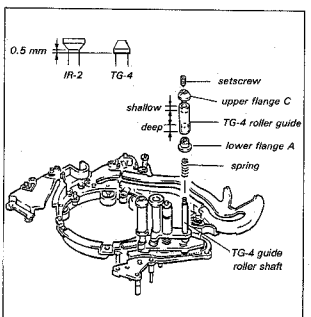
4-22. REPLACEMENT OF THE COMPONENT PARTS OF THE SUPPLY SIDE BASE

- Replacement of the S Sub Base,TG-4, TG-5, and IR-2 (impedance roller guide) on the S Base differs from replacement of the other components.
- Refer to Section 4-22-1 for TG-4, Section 4-22-2 for TG-5, Section 4-22-3 for IR-2, Section 4-22-4 for S Sub Base, and Section 4-22-5 for replacing the other components.

4-22-1.Replacement of the TG-4

Tool: Tape guide adjustment screwdriver
Mode: EJECT
Replacement procedure:

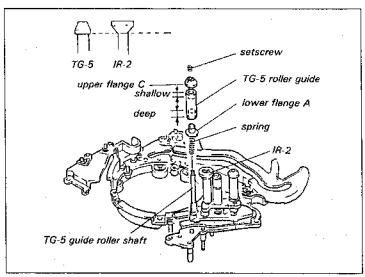
(1) Loosen the setscrew at the top of the TG-4 with the tape guide adjustment screwdriver.
(2) Remove the Upper Flange C.
(3) Remove the TG-4 Roller Guide, Lower Flange A, and the compression spring.
(4) Clean the TG-4 Guide Roller Shaft with the cleaning piece moistened with cleaning fluid.
(5) Insert the compression spring removed in Step (3) onto the TG-4 Guide Roller Shaft.
(6) Carefully insert the Lower Flange A and TG-4 Roller Guide onto the TG-4 Guide Roller Shaft in the direction as shown in the figure.
(7) Install the Upper Flange C, and adjust the position of the TG-4 Roller Guide so that the lower end of the Upper Flange of the TG-4 Guide Roller is about 0.5mm lower than the lower end of the IR-2 Guide Upper Flange.
(8) Tighten the setscrew at the top of the guide using a tape guide adjustment screwdriver.
(9) After replacement, perform the adjustments in Section 4-42.



4-22-2. Replacement of the TG-5

Tool: Tape guide adjustment screwdriver
Mode: EJECT
Replacement procedure:

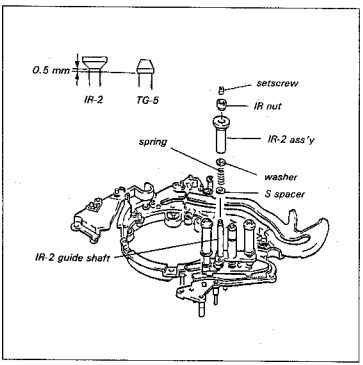
(1) Loosen the setscrew at the top of TG-5 with the tape guide adjustment screwdriver.
(2) Remove the Upper Flange C.
(3) Remove the TG-5 Roller Guide, Lower Flange A, and the compression spring.
(4) Clean the TG-5 Guide Roller Shaft with a cleaning piece moistened with cleaning fluid.
(5) Insert the compression spring removed in Step (3) onto the TG-5 Guide Roller Shaft.
(6) Carefully insert Lower Flange A and the TG-5 Roller Guide onto the TG-5 Guide Roller Shaft in the direction as shown in the figure.
(7) Install the Upper Flange C, and adjust the position of the TG-5 Guide Roller so that the lower end of the Upper Flange is the same in height as the lower end of the IR-2 Guide Upper Flange as viewed.
(8) Tighten the setscrew at the top of the guide with the tape guide adjustment screwdriver.
(9) After replacement, perform the adjustments in Section 4-42.



4-22-3. Replacement of the IR-2 Guide (Impedance Roller Guide)

Tool: Tape guide adjustment screwdriver
Mode: EJECT
Replacement procedure:

(1) Loosen the setscrew at the top of the IR-2 Guide with the tape guide adjustment screwdriver.
(2) Remove the IR Nut.
(3) Remove the IR-2 Assembly, washer (1.4mm dia.), compression spring, and S Spacer from the IR-2 Guide Shaft.
(4) Clean the IR-2 Guide Shaft with a cleaning piece moistened with cleaning fluid.
(5) Install the S Spacer, compression spring, and washer (1.4mm dia.) removed in Step (3) onto the IR-2 Guide Shaft.
(6) Carefully insert the new IR-2 Assembly onto the IR-2 Guide Shaft.
(7) Install the IR Nut, and adjust the position of the IR-2 Guide so that the lower end of the IR-2 Guide Upper Flange is about 0.5mm higher than the lower end of the TG-5 Guide Upper Flange.
(8) Tighten the setscrew at the top of the guide with the tape guide adjustment screwdriver.
(9) After replacement, perform the adjustments in Section 4-42.

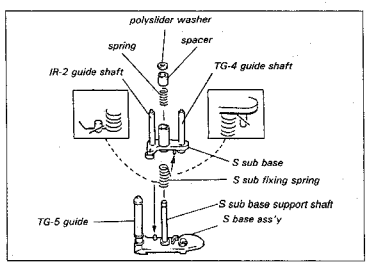


4-22-4. Replacement of the Supply Side Sub Base

- The TG-4 and IR-2 Guides are provided on the S Sub Base. When replacing the S Sub Base, replace the TG-4 and IR-2 Guides referring to Sections 4-22-1 and 4-22-3. Then, adjust the height with the TG-5 Guide as reference.

Tool: Tape guide adjustment screwdriver
Mode: EJECT
Replacement procedure:

(1) Remove the polyslider washer at the top of the S Sub Base.
(2) Remove the spacer, compression spring, S Sub Base on which TG-4 and IR-2 Guide are installed, and S Sub Fixing Spring.
(3) Clean the new S Sub Base TG-4 Guide Shaft and IR-2 Guide Shaft with a cleaning piece moistened with cleaning fluid.
(4) Remove the TG-4 Guide Roller and IR-2 Impedance Roller from the S Sub Base removed in Step (2) and install them on the new S Sub Base.
(5) Clean the S Sub Base Support Shaft with a cleaning piece moistened with cleaning fluid.
(6) Insert the S Sub Fixing Spring, S Sub Base (assembled in Step (4)), compression spring, and spacer onto the S Sub Base Support Shaft.
(7) Hook the S Sub Fixing Spring as shown in the figure.
(8) Insert the polyslider washer (1.5mm dia.) onto the top of the S Sub Base Shaft and fasten the S Sub Base.
(9) Adjust the height of the TG-4 and IR-2 Guides with the TG-5 Guide as reference. (Refer to Sections 4-22-1 and 4-22-3).
(10) After replacement, perform the adjustments in Section 4-42.



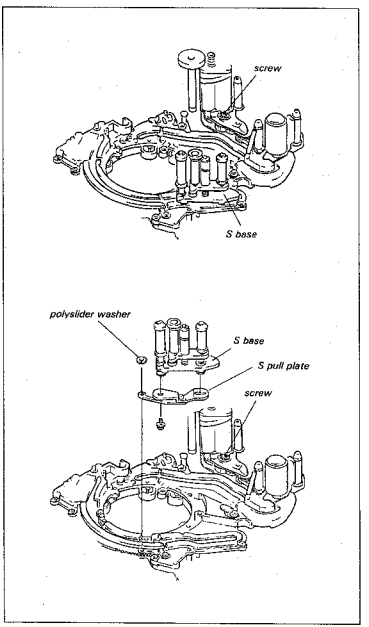
4-22-5. Replacement of the Component Parts of the Supply Side Base

- Refer to the appropriate section for replacing the TG-4, TG-5, and IR-2 Guides on the S Base.
- When replacing the components other than the above components on the S Base, remove the Drum Assembly from the unit so as not to damage it.

Mode: Turn the screw shown in the figure so that the S Side base reaches the end of the S Side rail.

Replacement procedure:

(1) Remove the Drum Assembly from the unit. (Refer to Section 4-6).
(2) Turn the screw and set the S Side Base in the position described above.
(3) Remove the S Side Rail (I). (Refer to Section 4-32).
(4) Remove the polyslider washer fixing the Supply Side Pull Plate and remove the S Side Base from the unit.
(5) Replace the faulty component which constitutes the S Side base.
(6) Assemble the S Side Base by reversing the Steps (1) through (4).
(7) After replacement, perform the adjustments in Section 4-42.



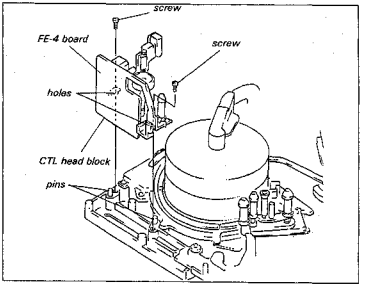
4-23. REPLACEMENT OF THE CTL HEAD BLOCK

- The CTL Head Block consists of the CTL Head, Erase Head, FE-4 Board, IR-1 Guide (impedance roller guide), and tape guide. Replacement of the above components is described below.
- When replacing the CTL Head, Erase Head, and FE-4 Board, remove the CTL Head Block from the unit. The removal and installation are described below.

Mode: EJECT

Removal and installation:

- Remove the two fixing screws of the CTL Head Block and remove the CTL Head Block from the unit. When removing, raise the CTL Head Block connector CN43 at the lower portion of the FE-4 Board which is connected into the mother board (MB-317/317P Board).
- Install the CTL Head Block on the chassis with the two screws so that the two pins of the chassis are inserted into the CTL Head Block holes.

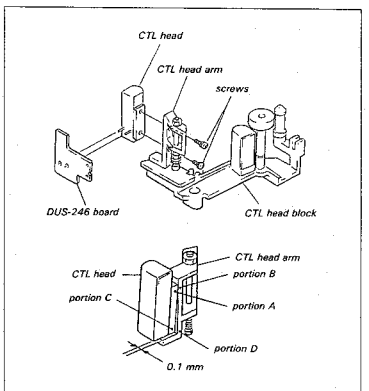


4-23-1. Replacement of the CTL Head

Mode: EJECT

Replacement procedure:

(1) Remove the CTL Head Block from the unit.
(2) Unsolder the DUS-246 Board which is mounted onto the CTL Head.
(3) Remove the two screws of the CTL Head Arm and remove the CTL Head.
(4) Install the new CTL Head to the CTL Head Arm with two screws snugly but do not tighten.
(5) Adjust the CTL Head position so that the surface of the CTL Head Bracket's upper end (portion A in the figure) is the same plane as that of the CTL Head Arm's upper end (portion B), and the CTL Head Bracket's lower end (portion C) is shifted by 0.1mm with respect to CTL Head Arm's lower end (portion D) as shown in the figure. Then, tighten the two fixing screws.
(Tightening torque: 3 ± 0.5kg.cm)
(6) Solder the DUS-246 Board removed in Step (2).
(7) Install the CTL Head Block on the unit.
(8) After replacement, perform the adjustments in Section 4-42.

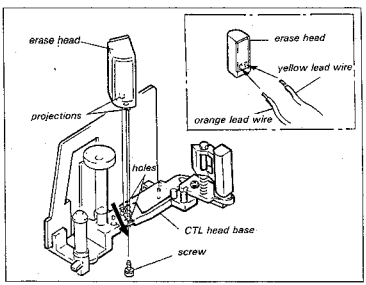


4-23-2. Replacement of the Erase Head

Mode: EJECT

Replacement procedure:

(1) Remove the CTL Head Block from the unit.
(2) Remove a screw from the lower side of the CTL Head Block and remove the Erase Head.
(3) Unsolder the two lead wires of the Erase Head.
(4) Solder two lead wires onto the new Erase Head. (When viewed from the back of the head, the yellow lead wire is located on the right, and the orange on the left.)
(5) Insert the two projections at the lower portion of the head into the holes of the CTL Head Base, and tighten the fixing screw while pushing it in the direction of the arrow.
(6) Install the CTL Head Block on the unit.
(7) After replacement, perform the adjustment in Section 4-42.

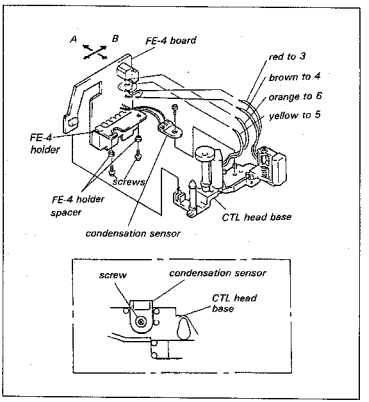


4-23-3.Replacement of the FE-4 Board

Mode: EJECT

Replacement procedure:

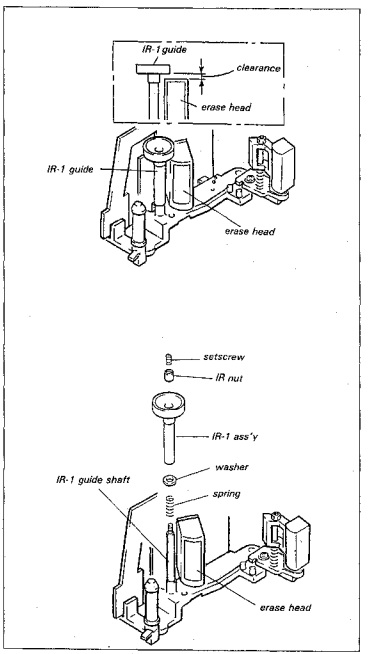
(1) Remove the CTL Head Block from the unit.
(2) Remove the condensation sensor which is attached to the CTL Head Base.
(3) Remove the two screws from the lower side of the CTL Head Block and remove the FE-4 Board. The FE-4 Holder Spacerers are inserted between the FE-4 Holder and screw. Be sure no to lose them.
(4) Unsolder the four lead wires on the FE-4 Board.
(5) Solder the lead wire removed in Step (4) onto the new FE-4 Board. (The brown lead wire is to 4,the red to 3, the orange to 6, and the yellow to 5.)
(6) Install the Condensation sensor removed in Step (2) in the position shown in the figure.
(7) Pass the FE-4 Holder Spacer through the screw in the direction as shown in the figure and install the FE-4 Board on the CTL Head Base.
(8) Check that the FE-4 Board is slightly shifted in the direction of the arrows A and B.
(9) Install the CTL Head Block on the unit.
(10) After replacement, perform the adjustment in Section 4-42.



4-23-4. Replacement of the IR-1 Guide (Impedance Roller Guide)

Tool: Thickness gauge
Tape guide adjustment screwdriver
Mode: EJECT
Replacement procedure:

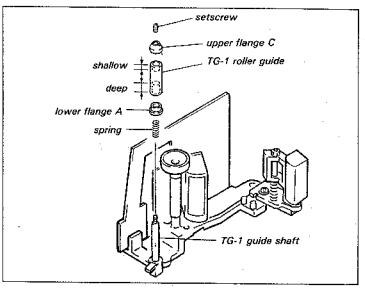
(1) Measure the clearance between the lower surface of the IR-1 Guide's Upper Flange and Erase Head with the thickness gauge. (The clearance should be memorized.)
(2) Loosen the setscrew at the top of the IR-1 Guide with the tape guide adjustment screwdriver.
(3) Remove the IR Nut.
(4) Remove the IR-1 Assembly,washer(1.4mm dia.),and compression spring from the IR-1 Guide Shaft.
(5) Clean the IR-1 Guide Shaft with a cleaning piece moistened with cleaning fluid.
(6) Install the compression spring and washer(1.4mm dia.) remove in Step (4) onto the IR-1 Guide Shaft.
(7) Carefully insert the new IR-1 Assembly onto the IR-1 Guide Shaft.
(8) Install the IR Nut.
(9) Adjust the height of the IR-1 Guide using the IR Nut so that the clearance between the lower surface of the IR-1 Guide's Upper Flange and the Erase Head is the same as the clearance measured in Step (1).
(10) Tighten the setscrew at the top of the guide with the tape guide adjustment screwdriver.
(11) Recheck the clearance between the lower surface of the IR-1 Guide's Upper Flange and the Erase Head. When the clearance does not meet the required specification, repeat Steps (9) and (10).
(12) After replacement, perform the adjustment in Section 4-42.



4-24. REPLACEMENT OF THE TG-1

Tool: Tape guide adjustment screwdriver
Mode: EJECT
Replacement procedure:

(1) Loosen the setscrew at the top of the TG-1 with the tape guide adjustment screwdriver.
(2) Remove the Upper Flange C.
(3) Remove the TG-1 Roller Guide, Lower Flange A, and the compression spring.
(4) Clean the TG-1 Guide Shaft with a cleaning piece moistened with cleaning fluid.
(5) Insert the compression spring removed in Step (3) onto the TG-1 Guide Shaft.
(6) Carefully insert the Lower Flange A and the TG-1 Roller Guide onto the TG-1 Guide Shaft in the direction as shown in the figure.
(7) Install the Upper Flange C.
(8) Tighten the setscrew at the top of the guide with the tape guide adjustment screwdriver.
(9) After replacement, perform the adjustment in Section 4-42.



4-25. REPLACEMENT OF THE A/T HEAD

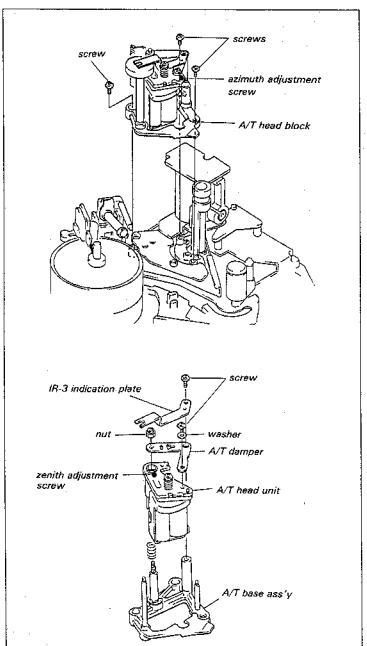
- When replacing the A/T Head, be careful not to loosen or tighten the azimuth adjustment screw and zenith adjustment screw shown in the figure.

Tool: Flatness plate
Thickness gauge
Tweezers
Flatness check tool

Mode: EJECT

Replacement procedure:

(1) Remove the flexible board (FL-55 Board) of the A/T Head Block which is connected to connectors CN3 and CN7 on the TB-5 Board with the tweezers. (Refer to Section 3-9).
(2) Remove the three fixing screws of the A/T Head Block and remove the A/T Head Block from the unit. Be careful not to damage the flexible board (FL-55 Board).
(3) Unsolder the ten terminals the FL-55 Board which is soldered to the A/T Head and remove the FL-55 Board from the A/T Head Block.
(4) Remove the two screws and one nut shown in the figure, then remove the A/T Head Unit from the A/T Head Block.
(5) Remove the screw located in the center of the A/T Head Unit and remove the A/T Head Unit Sub Assembly from the A/T Plate (Upper) Assembly.
(6) As shown in the figure, put the flatness plate on the flatness check tool and place the A/T Head Unit Sub Assembly (removed in Step (5)) on it.
(7) Check the clearance between the flatness check tool and the edge of the A/T Plate (Lower) with the thickness guage.



(8) Remove the two screws shown in the figure, remove the A/T Head and A/T Shield Case from the A/T Plate (Lower), and replace the new A/T Head. Thread the two screws on the head snugly but do not tighten.

(9) Put the A/T Head Unit Sub Assembly on the flatness check tool as in Step (6) and insert the thickness gauge checked in Step (7) between the A/T Plate (Lower) and flatness check tool.

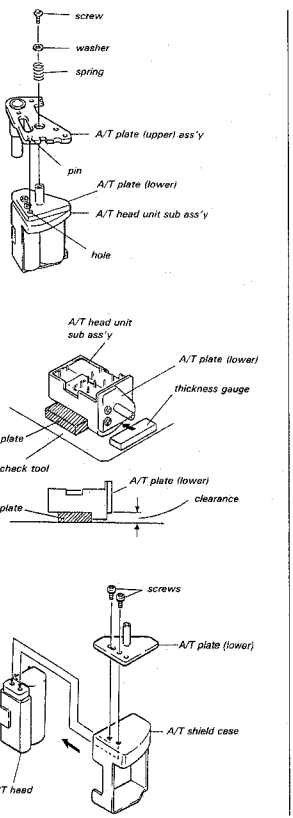
(10) Tighten the two A/T Head fixing screws while pushing the A/T Head and A/T Plate (Lower) toward the flatness check tool.
(NOTE) Be careful not to damage the head.

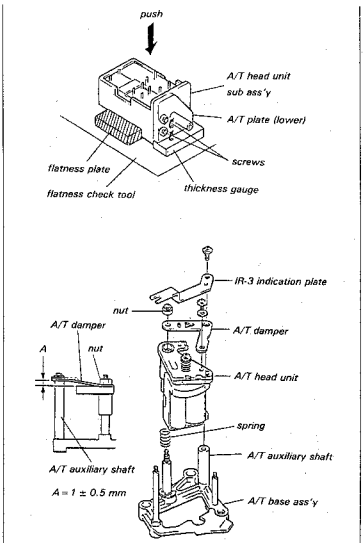
(11) Install the A/T Head Unit Sub Assembly on the A/T Plate (Upper) Assembly by reversing the Step (5). Check that the pin of the A/T Plate (Upper) Assembly is inserted into the hole of the A/T Plate (Lower).

(12) Install the A/T Head Unit on the A/T Base Assembly. As shown in the figure, adjust the nut so that clearance A between the tip of the A/T Auxiliary Shaft and A/T Plate (Upper) Assembly meets the required specification as viewed.

(13) Assemble the A/T Head Block in the unit by reversing the Steps (1) through (3).

(14) After replacement, perform the adjustment in Section 4-42.

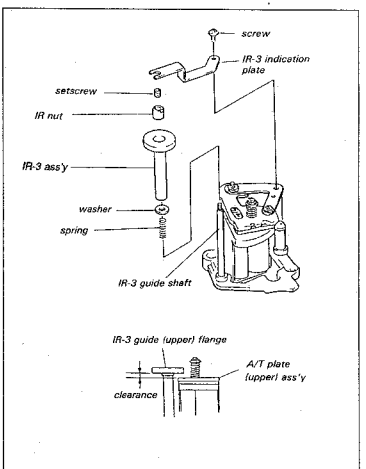



push
A/T head unit
sub ass'y
A/T plate (lower)
screws
flatness plate
flatness check tool
thickness gauge
IR-3 indication plate
nut
A/T damper
A/T damper
A
nut
A/T head unit
spring
A/T auxiliary shaft
A/T auxiliary shaft
A = 1 ± 0.5 mm
A/T base ass'y

4-26. REPLACEMENT OF THE IR-3 GUIDE (IMPEDANCE ROLLER GUIDE)

Tool: Thickness gauge
Tape guide adjustment screwdriver
Mode: EJECT
Replacement procedure:

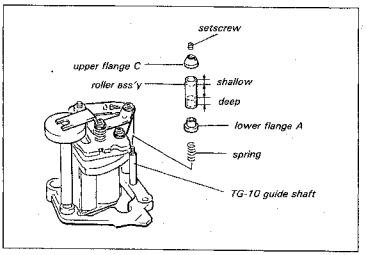
(1) Measure the clearance between the lower surface of an IR-3 Guide's Upper Flange and the A/T Plate (Upper) Assembly with the thickness gauge.
(The clearance should be memorized.)
(2) Remove the screw and remove the IR-3 Supporting Plate.
(3) Loosen the setscrew at the top of the IR-3 Guide with the tape guide adjustment screwdriver.
(4) Remove the IR nut.
(5) Remove an IR-3 Assembly, washer (1.4mm dia.), and compression spring from the IR-3 Guide Shaft.
(6) Clean the IR-3 Guide Shaft with a cleaning piece moistened with cleaning fluid.
(7) Install the compression spring and washer (1.4mm dia.) removed in Step (5) onto the IR-3 Guide Shaft.
(8) Carefully insert the new IR-3 Assembly onto the IR-3 Guide Shaft.
(9) Install the IR Nut.
(10) Adjust the height of the IR-3 Guide using the IR Nut so that the clearance between the lower surface of the IR-3 Guide's Upper Flange and the A/T Plate (Upper) Assembly is the same as the clearance measured in Step (1).
(11) Tighten the setscrew at the top of the guide with the tape guide adjustment screwdriver.
(12) Recheck the clearance between the lower surface of the IR-3 Guide's Upper Flange and the A/T Plate (Upper) Assembly. When the clearance dose not meet the required specification, repeat Steps (10) and (11).
(13) After replacement, perform the adjustments in Section 4-42.



4-27. REPLACEMENT OF THE TG-10

Tool: Tape guide adjustment screwdriver
Mode: EJECT
Replacement procedure:

(1) Loosen the setscrew at the top of the TG-10 with the tape guide adjustment screwdriver.
(2) Remove the Upper Flange C.
(3) Remove the Roller Assembly, Lower Flange A, and the compression spring.
(4) Clean the TG-10 Guide Shaft with a cleaning piece moistened with cleaning fluid.
(5) Insert the compression spring removed in Step (3) onto the TG-5 Guide Shaft.
(6) Carefully insert the Lower Flange A and the Roller Assembly onto TG-10 Guide Shaft in the direction shown in the figure.
(7) Install the Upper Flange C.
(8) Tighten the setscrew at the top of the guide with the tape guide adjustment screwdriver.
(9) After replacement, perform the adjustments in Section 4-42.

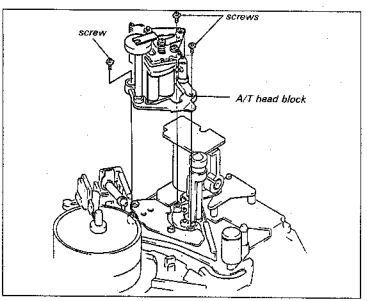


4-28. REPLACEMENT OF THE COMPONENT PARTS OF THE TAKE-UP SIDE SUB BASE

- The T Sub Base Block consists of the TG-8 and the Slant Guide. Replacement of the above componenets is described below.
- When replacing the above components, remove the A/T Head Block from the unit. The removal and installation procedures are described below.

Tool: Tweezers
Mode: EJECT
Removal and installation Procedures:

- Remove the flexible board (FL-55 Board) of the A/T Head Block which is connected to connectors CN3 and CN7 on the TB-5 Board with the tweezers. (Refer to Section 3-9.)
- Remove the three fixing screws of the A/T Head Block and remove the A/T Head Block from the unit. Be careful not to damage the flexible board (FL-55 Board) and A/T Head.
- Install by reversing the above.
- When replacing the component of the T Sub Base, not to remove the frame of the T Sub Base (T Sub Rotation Table) and T Sub Adjustment Plate from the unit.



4-28-1. Replacement of the TG-8

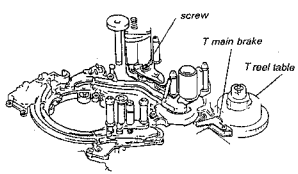
• TG-8 is the component part of the T Sub Base Block.

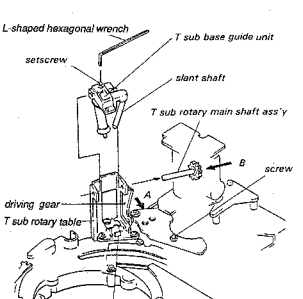
Tool: L-shaped hexagonal wrench (across flat has 0.89mm.)
Tension gauge (50g full scale)

Mode: EJECT → Threading end→ EJECT

Replacement procedure:

(1) Turn the screw clockwise until each of the tape guides are at position of the threading end as shown in the figure. Keep turning clockwise until the T Main Brake is pressed against the T Reel.
(2) Remove the A/T Head Block from the unit.
(3) Loosen the setscrew at the top of the T Sub Base by turning two or three times with the L-shaped hexagonal wrench.
(4) Pull the T Sub Rotary Main Shaft Assembly to the A/T head side. Then the T Sub Base Guide Unit can be removed.
(5) Remove the polyslider washer from the top of the TG-8 Guide.
(6) Remove the compression spring, Roller Flange A, Roller Assembly (TG-8), and Roller Flange B from the TG-8 Guide Shaft.
(7) Clean the TG-8 Guide Shaft with a cleaning piece moistened with cleaning fluid.
(8) Carefully insert the Roller Flange B, Roller Assembly (TG-8), and Roller Flange A onto the TG-8 Guide Shaft in the direction as shown in the figure.
(9) Insert the compression spring onto the TG-8 Guide Shaft, then push the 1.2mm diameter polyslider washer on the shaft.
(10) Install the assembled T Aub Base Guide Unit onto the T Sub Rotary Table with the T Sub Rotary Table with the T Sub Rotary Main Shaft assembly. (Do not tighten the setscrew too much.)





(11) Slowly turn the screws mentioned in Steps (1) counterclockwise until the T Sub Fixed Bracket touches the T Sub Rotary Table. (At that time, do not move the Driving Gear of the T Sub Rotary Table.)

(12) Push the top edge of the TG-8 Guide Shaft onto the T Sub Rotary Table side (the opposite side to the drum).

(13) Turn the screws clockwise until the T Main Brake is pressed against the T Reel Table as described in Step (1).

(14) While pushing the Driving Gear in the direction of the arrow A and T Sub Rotary Main Shaft Assembly in the direction of the arrow B, tighten the setscrew.

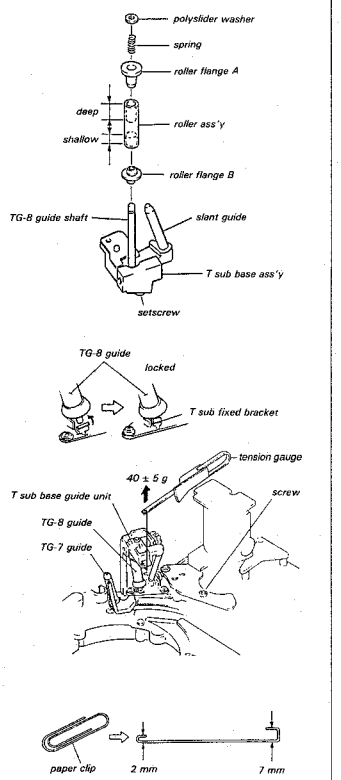
(15) Turn the screw described in Step (1) so that the top edge of the TG-8 is locked by the T Sub Fixed Bracket.

(16) Reform the small paper clip as shown in the figure.

(17) Insert the reformed paper clip into the hole of the T Sub Base Guide Unit and hang the tension gauge on the other end.

(18) Move the tension gauge in the upward direction to the unit until it shows 40 ± 5g. (Never applied 50g or more.)

(19) Turn the screw described in Step (1) clockwise, and check that the top edge of the TG-8 Guide is firmly locked by the T Sub Fixed Bracket. When threading or unthreading check that the TG-8 Guide Roller and the TG-7 Guide are not touching. If the specification is not satisfied, perform the Step (14) again. At that time, change the degree of pressure a little when pushing in the direction of arrow A.

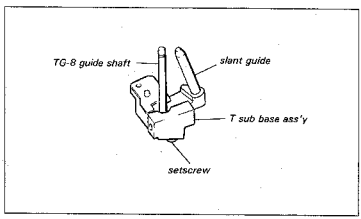


4-28-2. Replacement of the Slant Guide

• The Slant Guide is the component part of the T Sub Base Block.

Tool: L-shaped hexagonal wrench (across flat has 0.89mm dia.)
Mode: EJECT → Threading end →EJECT
Replacement procedure:

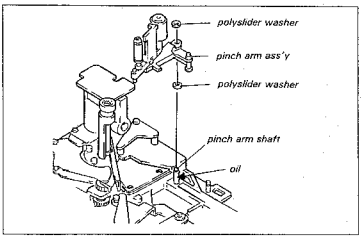
(1) The same as in Steps (1) through (6) of Section 4-28-1.
(2) Remove the setscrew from the removed T Sub Base Assembly and install it on the new T Sub Base Assembly.
(3) Clean the TG-8 Guide Shaft of the T Sub Base Assembly and Slant Guide with a cleaning piece moistened with cleaning fluid.
(4) Assemble as described in Steps (8) through (19) of Section 4-28-1.
(5) After replacement, perform the adjustments in Section 4-42.



4-29. REPLACEMENT OF THE PINCH ARM ASSEMBLY

Tool: Tweezers
Mode: EJECT
Replacement procedure:

(1) Remove the Pinch Arm Lock Lever from the unit. (Refer to Section 4-19.)
(2) Remove the polyslider washer fixing the Pinch Arm Assembly and remove the assembly from the unit.
(3) Clean the Pinch Arm Shaft with a cleaning piece moistened with cleaning fluid.
(4) Apply a 1/4 drop of Sony oil on the Pinch Arm Shaft.
(5) Install the new Pinch Arm Assembly.
(6) Insert the polyslider washer (1.2mm dia.) onto the shaft and fasten the Pinch Arm Assembly.
(7) Install the Pinch Arm Lock Lever. (Refer to Section 4-19.)
(8) After replacement, perform the adjustment in Section 4-42.



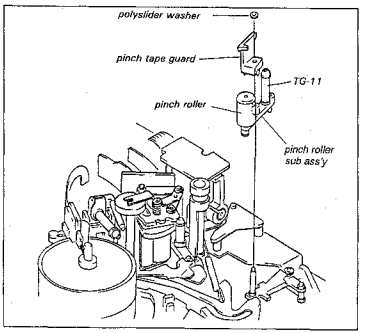
4-30. REPLACEMENT OF THE PINCH ROLLER SUB ASSEMBLY

- The TG-11 Guide is installed on the shaft of the Pinch Roller sub Assembly.
- When replacing the Pinch Roller Sub Assembly, the TG-11 Guide must be replaced at the same time.
  (Refer to Section 4-31.)

Mode: EJECT

Replacement procedure:

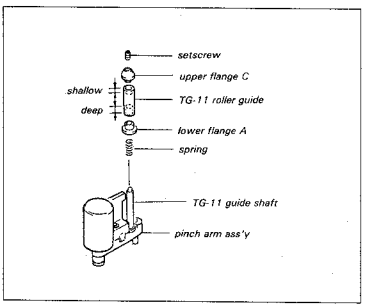
(1) Remove the polyslider washer fixing the Pinch Roller Sub Assembly onto the Pinch Arm Assembly.
(2) Remove the Pinch Tape Guard and the Pinch Roller Sub Assembly from the unit.
(3) Install the TG-11 Guide of the old Pinch Roller Sub Assembly onto the new Pinch Roller Sub Assembly as described in Section 4-31.
(4) After installing the Pinch Roller Sub Assembly and the Pinch Tape Guard on the Pinch Arm Assembly, push a polyslider washer onto the shaft.
(5) Clean the pinch roller with a cleaning piece moistened with cleaning fluid.



4-31. REPLACEMENT OF THE TG-11

Tool: Tape guide adjustment screwdriver
Mode: EJECT
Replacement procedure:

(1) Loosen the setscrew at the top of the TG-11 with the tape guide adjustment screwdriver.
(2) Remove the Upper Flange C.
(3) Remove the TG-11 Roller Guide, Lower Flange A, and the compression spring.
(4) Clean the TG-11 Guide Shaft with a cleaning piece moistened with cleaning fluid.
(5) Insert the compression spring removed in Step (3) onto the TG-11 Shaft.
(6) Carefully insert the Lower Flange A and the TG-11 Roller Guide onto the TG-11 Guide Shaft in the direction as shown in the figure.
(7) Install the Lower Flange C.
(8) Tighten the setscrew at the top of the guide with the tape guide adjustment screwdriver.
(9) After replacement, perform the adjustment in Section 4-42.

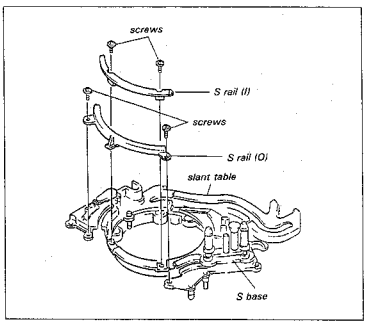


4-32. REPLACEMENT OF THE SUPPLY SIDE RAIL (I)

Mode: EJECT

Replacement procedure:

(1) Remove the Drum Assembly from the unit. (Refer to Section 4-6.)
(2) Remove the two screws on the S Rail (I) and remove it from the unit.
(3) Install the new S Rail (I) on the unit so that the clearance between the new S Rail (I) and S Rail (O) is 3.1 to 3.4mm.
(4) Repeat threading and unthreading two or three times and check that they can be done smoothly.
(5) Install the Drum Assembly on the unit.
(6) After replacement, perform the adjustments in Section 4-42.



4-33. REPLACEMENT OF THE SUPPLY SIDE RAIL (O)

Mode: EJECT

Replacement procedure:

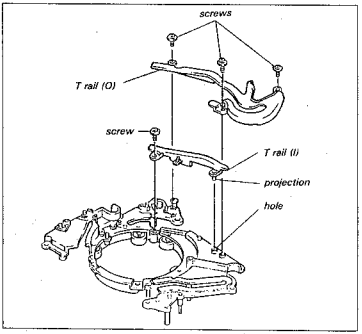
(1) Remove the two screws of the S Rail (O) and remove it from the unit.
(2) Install a new S rail (O) on the unit so that the clearance between the new S Rail (O) and S Rail (I) is 3.1 to 3.4mm.
(3) Repeat threading and unthreading two or three times and check that they can be done smoothly.

4-34. REPLACEMENT OF THE TAKE-UP SIDE RAIL (I)

Mode: Threading end

Replacement procedure:

(1) Remove the Drum Assembly from the unit. (Refer to Section 4-6.)
(2) Remove a fixing screw on the T Rail (I) and remove it from the unit.
(3) Install the new T Rail (I) so that its projection is inserted into the chassis hole and the clearance between the new T Rail (I) and T Rail (O) is 3.1mm to 3.5mm.
(4) Repeat threading and unthreading two or three times and check that they can be done smoothly.
(5) Install the Drum Assembly on the unit.
(6) After replacement, perform the adjustments in Section 4-42.



4-35. REPLACEMENT OF THE TAKE-UP SIDE RAIL(O)

Mode: Threading end

Replacement procedure:

(1) Remove the three fixing screws of the T Rail (O) and remove it.
(2) Install the new T Rail (O) on the unit so that the clearance between the new T Rail (O) and T Rail (I) is 3.1 to 3.5mm.
(3) Repeat threading and unthreading two or three times and check that they can be done smoothly.

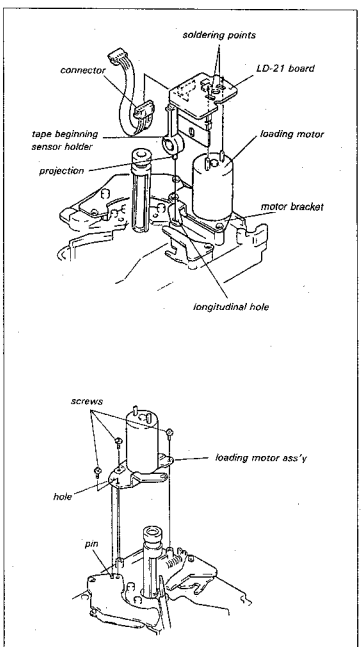
4-36. REPLACEMENT OF THE LOADING MOTOR

- When replacing the Loading Motor, replacement of the Loading Motor Assembly is recommended.

Mode: EJECT

Replacement procedure:

(1) Remove the connector on the LD-21 Board of the upper portion of the Loading Motor.
(2) Unsolder the two terminals, then remove the LD-21 Board from the Loading Motor.
(3) Remove the three screws shown in the figure, then remove the Loading Motor Assembly from the unit.
(4) After inserting the chassis pin into the hole of the new Loading Motor Assembly, install the Loading Motor Assembly, install the Loading Motor Assembly with the three fixing screws.
(5) Assemble by reversing the Steps (1) and (2). When installing, make sure that the projection at the lower part of the Tape Beginning Sensor Holder on the LD-21 Board is in the logitudinal hole of the Motor Bracket.

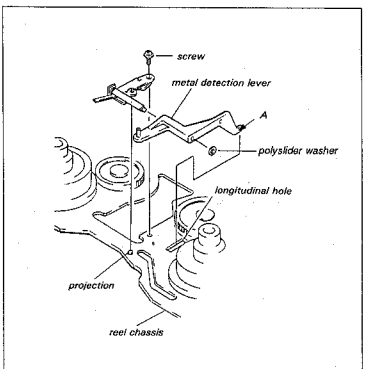


4-37. REPLACEMENT OF THE METAL DETECTION LEVER

Mode: EJECT

Replacement procedure:

(1) Remove the Brake Slider refering to Section 4-17.
(2) Remove a screw of the Metal Detection Lever and remove it from the unit.
(3) Remove the polyslider washer of the Metal Detection Lever and replace it with the new one.
(4) Install the Metal Detection Lever with the 1.2mm diameter polyslider washer.
(5) Install the Metal Detection Lever on the chassis and fix it with the fixing screw so that portion A of the Metal Detection Lever is inserted into the logitudinal hole and the projection of the reel chassis is inserted into the hole of the Metal Detection Lever.
(6) Install the Brake Slider refering to Section 4-17.

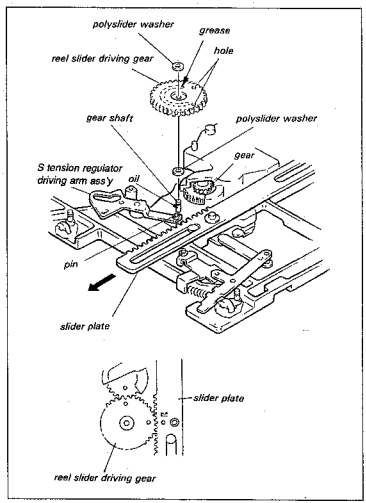


4-38. REPLACEMENT OF THE REEL SLIDER DRIVING GEAR

- When replacing this part, remove the Reel Chassis from the Mechanical Deck Block. (Refer to Section 3-16.)

Tool: Sony grease
Sony oil
Mode: EJECT
Replacement procedure:

(1) Remove the Reel Chassis. (Refer to Section 3-16.)
(2) Remove the polyslider washer fixing the Reel Slider Driving Gear, then remove the Reel Slider Driving Gear and the polyslider washer (1.6mm dia.).
(3) Clean the Gear Shaft with a cleaning piece moistened with cleaning fluid.
(4) Install the polyslider washer (1.6mm dia.) on the shaft.
(5) Apply a 1/4 drop of Sony oil on the shaft.
(6) Smear a little Sony grease onto the groove of the new Reel Slider Driving Gear.
(7) Move the Slider manually in the direction of the arrow until it stops.
(8) Insert the Reel Slider Driving Gear into the shaft so that the pin of the S Tension Regulator Driving Arm Assembly is into the groove of the Driving Gear, and so that the positional relationship between the holes on the other gear and the slider plate and two holes of the Driving Gear as shown in the figure.
(9) Push the polyslider washer (1.2mm dia.) onto the shaft and fasten the Reel Slider Driving Gear.
(10) Install the Reel Chassis. (Refer to section 3-16.)



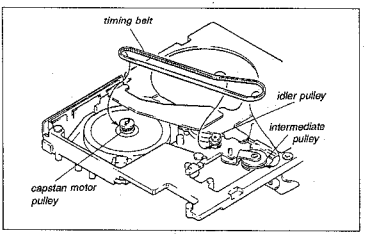
4-39. REPLACEMENT OF THE TIMING BELT

- When replacing this part, remove the Mechanical Deck Block from the unit. (Refer to Section 3-12.)

Mode: EJECT

Replacement procedure:

(1) Remove the Mechanical Deck Block from the unit.
(Refer to Section 3-12.)
(2) Remove the Timing Belt.
(3) Place the new Timing Belt on the Capstan Motor Pulley, the Intermediate Pulley, then on the Idler Pulley in that order.



4-40. REPLACEMENT OF THE CAPSTAN MOTOR

- When replacing this part, remove the Mechanical Deck Block from the unit. (Refer to Section 3-12.)

Mode: EJECT

Replacement procedure:

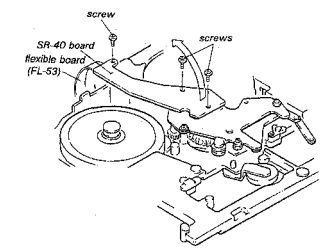
(1) Remove the Mechanical Deck Block from the unit.
(Refer to Section 3-12.)

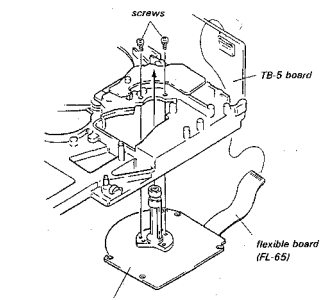
(2) Remove the three fixing screws of the SR-40 Board on the back of the Mechanical Deck Block and open the SR-40 Board on the flexible board side.

(3) After removing flexible connector CN2 on the TB-5 Board from the front of the Mechanical Deck Block, remove the two fixing screws on the Capstan Motor, then remove the Capstan Motor from the unit.

(4) Install the new Capstan Motor on the Mechanical Deck Block by reversing the Steps (1) through (3).
(NOTE) It is recommended for easy installing that the tip of the flexible board (FL-65 Board) makes flat.

(5) Assemble by reversing the Step (2).





4-41. REPLACEMENT OF THE GEAR BLOCK

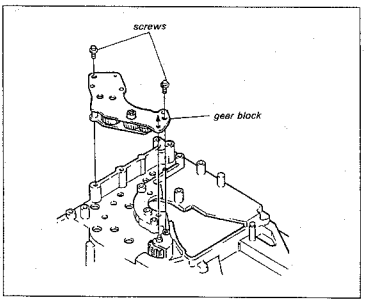
Mode: EJECT

Replacement procedure:

(1) Remove the Loading Motor as described in Section 4-36, and remove the A/T Head Block as in Section 4-25.

(2) Remove the two fixing screws as shown in the figure, remove the Gear Block, and replace with the new one.

(3) Install the A/T Head Block and the Loading Motor Block as described in Sections 4-25 and 4-36.



4-42. ITEMS TO BE ADJUSTED AFTER THE MAIN PARTS REPLACEMENT

(Numbers in parenthesis refer to Section Nos.)

Replacement of the Upper Drum Assembly

Brush Position Adjustment (6-16) → Tracking Adjustment (6-8) → Tape Path Adjustment (PLAY mode)(6-1) → Tape Path Check (FF,REW mode)(6-2) → CTL Head Height Adjustment (6-9) → CTL Head Position Adjustment (6-10) → TC Head Position Adjustment (6-12) → Audio Head Height Adjustment (6-13) → TC Head Position Adjustment (check)(6-12) → Audio Head Phase Adjustment (6-14) → PB Switching Position Adjustment (6-15) → Video System Adjustment (8-5)

Replacement of the Drum Assembly

Tracking Adjustment (6-8) → Tape Path Adjustment (PLAY mode)(6-1) → Tape Path Check (FF, REW mode)(6-2) → CTL Head Height Adjustment (6-9) → CTL Head Position Adjustment (6-10) → TC Head Position Adjustment (6-12) → Audio Head Height Adjustment (6-13) → TC Head Position Adjustment (check)(6-12) → Audio Head Phase Adjustment (6-14) → PB Switching Position Adjustment (6-15) → Servo check (8-3) → Video System Adjustment (8-5)

Replacement of the S Reel Table

Tension Regulator Operating Position Adjustment (check)(5-8) → PLAY Back Tension Adjustment (check)(6-4)

Replacement of the Tension Regulator Band

Tension Regulator Operating Position Adjustment (5-8) → PLAY Back Tension Adjustment (6-4)

Replacement of the Tension Regulator

Tension regulator Operation Position Adjustment (5-8) → Tape Path Adjustment (PLAY mode)(6-1) → Tape Path Check (FF, REW mode)(6-2) → PLAY Back Tension Adjustment (6-4) → Tracking Adjustment (check)(6-8)

Replacement of the TG-7

Threading Position Check (Take-up side)(5-6) → Tape Threading/Unthreading Check (6-3) → Tape Path Adjustment (PLAY mode)(6-1) → Tape Path Check (FF, REW mode)(6-2) → Tracking Adjustment (check)(6-8)

Replacemet of the Component Parts of the T Base

Threading Position Check (Take-up side)(5-6) → Tape Threading/Unthreading Check (6-3) → Tape Path Adjustment (PLAY mode)(6-1) → Tape Path Check (FF, REW mode)(6-2) → Tracking Adjustment (6-8) → Tape Path adjustment (PLAY mode)(check)(6-1) → Tape Path check (FF, REW mode)(6-2) → CTL Head Height Adjustment (check)(6-9) → CTL Head Position Adjustment (check)(6-10) → TC Head Position Adjustment (6-12) → Audio Head Height Adjustment (6-13) → TC Head Position Adjustment (check)(6-12) → Audio Head Phase Adjustment (6-14) → PB Switching Position Adjustment (6-15)

Replacement of the TG-4

Threading Position Check (Supply side)(5-5) → Tape Threading/Unthreading Check (6-3) → Tracking Adjustment (check)(6-8) → Tape Path Adjustment (PLAY mode) (check)(6-1) → Tape Path Check (FF, REW mode)(6-2) → CTL Head Height Asjustment (check)(6-9)

Replacement of the TG-5

Threading Position Check (Supply side)(5-5) → Tape Threading/Unthreading check (6-3) → Tracking Adjustment (6-8) → Tape Path Adjustment (PLAY mode)(check) (6-1) → Tape Path Check (FF, REW mode)(6-2) → CTL Head Height Adjustment (check)(6-9)

Replacement of the IR-2

Threading Position Check (Supply side)(5-5) → Impedance Roller Guide II Clearance Adjustment (5-7) → Tape Threading/Unthreading Check (6-3) → Tracking Adjustment (check)(6-8) → Tape Path Adjustment (PLAY mode)(check) (6-1) → Tape Path Check (FF, REW mode)(6-2) → CTL Head Height Adjustment (check)(6-9)

Replacement of the S Sub base

Threading Position Check (Supply side)(5-5) → Impedance Roller Guide II Clearance Adjustment (5-7) → Tape Threading/Unthreading Check (6-3) → Tracking Adjustment (check)(6-8) → Tape Path Adjustment (PLAY mode)(check) (6-1) → Tape Path Check (FF, REW mode)(6-2) → CTL Head Height Adjustment (check)(6-9) → CTL Head Position Adjustment (check)(6-10) → TC Head Position Adjustment (check)(6-12)

Replacement of the Component Parts of the S Base

Threading Position Check (Supply side)(5-5) → Impedance Roller Guide 2 Clearance Adjustment (check)(5-7) → Tape Threading/Unthreading Check (6-3) → Tracking Adjustment (check)(6-8) → Tape Path adjustment (PLAY mode)(check) (6-1) → Tape Path Check (FF, REW mode)(6-2) → CTL Head Height Adjustment (6-9) → CTL Head Position Adjustment (6-10) → TC Head Position Adjustment (6-12) → Audio Head Height Adjustment (6-13) → TC Head Position Adjustment (check)(6-12) → Audio Head Phase Adjustment (6-14) → PB Switching Position Adjustment (6-15)

Replacement of the CTL Head

Tracking Adjustment (check)(6-8) → Tape Path Adjustment (PLAY mode)(check) (6-1) → Tape Path Check (FF, REW mode)(6-2) → CTL Head Height Adjustment (6-9) → CTL Head Position Adjustment (6-10) → TC Head Position Adjustment (6-12)

Replacement of the Erase Head and the FE-4 Board

Tracking Adjustment (check)(6-8) → Tape Path Adjustment (PLAY mode)(check) (6-1) → Tape Path Check (FF, REW mode)(6-2) → CTL Head Position Adjustment (6-10) → TC Head Position Adjustment (6-12)

Replacement of the IR-1 Guide (Impedance Roller Guide), TG-1 Guide, IR-3 Guide, and the TG-10 Guide

Tape Path Adjustment (PLAY mode)(check)(6-1) → Tape Path Check (FF, REW mode) (6-2)

Replacement of the A/T Head

Audio Head Zenith Adjustment (6-11) → Tape Threading/Unthreading check (6-3) → Tracking Adjustment (check)(6-8) → Tape Path Adjustment (PLAY mode)(check) (6-1) → Tape Path Check (FF, REW mode)(6-2) → Audio Head Height Adjustment (6-13) → Audio Head Phase Adjustment (6-14) → Audio System Adjustment (8-4)

Replacement of the TG-8 Guide and the Slant Guide

Tape Threading/Unthreading Check (6-3) → Tracking Adjustment (check)(6-8) → Tape Path adjustment (PLAY mode)(check)(6-1) → Tape Path Check (FF, REW mode) (6-2) → Audio Head Height Adjustment (6-13) → Audio Head Phase Adjustment (6-14)

Replacement of the Pinch Arm Assembly and the Pinch Roller Sub assembly

Pinch Press Lever Position Adjustment (5-3) → Tape Threading/Unthreading Check (6-3) → Tape Path Check (Around the Pinch Roller)(6-5) → Tape Path Adjustment (PLAY mode)(6-1) → Tape Path Check (FF, REW mode)(6-2)

Replacement of the TG-11

Tape Threading/Unthreading Check (6-3) → Tape Path Check (Around the Pinch Roller)(6-5) → Tape Path Adjustment (PLAY mode)(6-1) → Tape Path check (FF, REW mode)(6-2)

Replacement of the S Rail (I)

Threading Position Check (Supply side)(5-5) → Tape Threading/Unthreading Check (6-3) → Tracking Adjustment (check)(6-8) → Tape Path Adjustment (PLAY mode) (check)(6-1) → Tape Path Check (FF, REW mode)(6-2) → CTL Head Height Adjustment (6-9) → CTL Head Position Adjustment (6-10) → TC Head Position Adjustment (6-12) → Audio Head Height Adjustment (6-13) → TC Head Position Adjustment (check)(6-12) → Audio Head Phase Adjustment (6-14) → PB Switching Position Adjustment (6-15)

Replacement of the T Rail (I)

Threading Position Check (Take-up side)(5-6) → Tape Threading/Unthreading Check (6-3) → Tracking Adjustment (check)(6-8) → Tape Path Adjustment (PLAY mode)(check)(6-1) → Tape Path Check (FF, REW mode)(6-2) → CTL Head Height Adjustment (6-9) → CTL Head Position Adjustment (6-10) → TC Head Position Adjustment (6-12) → Audio Head Height Adjustment (6-13) → TC Head Position Adjustment (check)(6-12) → Audio Head Phase Adjustment (6-14) → PB Switching Position Adjustment (6-15)

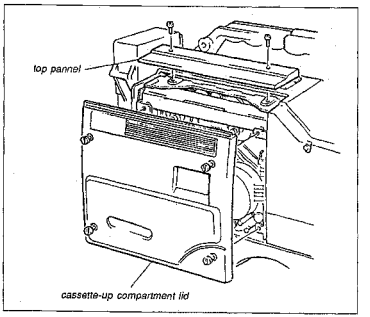
SECTION 5
LINK SYSTEM ALIGNMENT

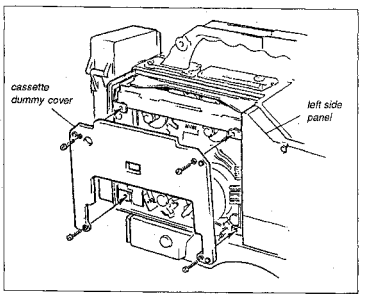
(Preparations)

1. VTR's Mechanical Deck Block Adjustment

Adjust the VTR's mechanical deck block as follows.

(1) Put the VTR into the threading end mode.
(2) Remove the Top Panel.
(3) Remove the Cassette-up Compartment Lid and install the Cassette Dummy Cover which is prepared for service.
(4) Remove the Left Side Panel.





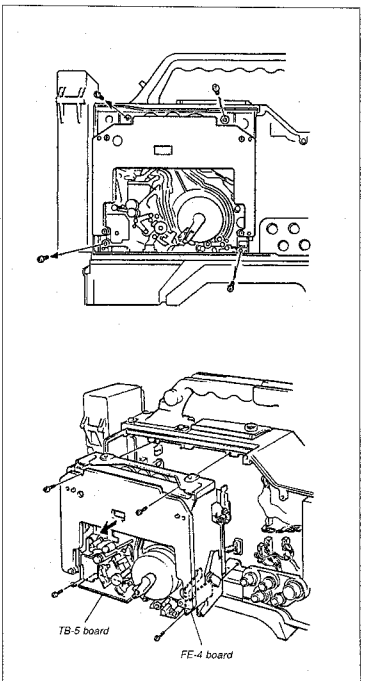
(5) Remove the four screws which secure the mechanical deck block to the unit by using the hexagon bit.

(6) Remove the mechanical deck block from the unit while removing the connectors below on the mother board.

Drum:	CN41 and CN42
FE-4 board:	CN43
TB-5 board:	CN44

(7) Connect the Extension Harness which is prepared for service to the above connectors on the mechanical deck block.

(8) Connect the harness connector of the Extension Harness to the above connectors on the unit's mother board.

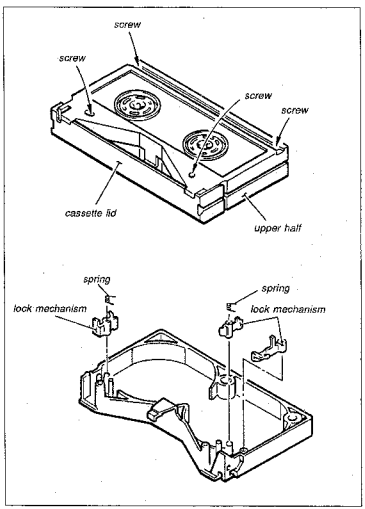


2. Creating the Blank Cassette/Cassette Tape without Lid/Alignment Tape without Lid

Since the VTR is designed to compact size, some mechanical checks and adjustments cannot be performed when a cassette tape lid or cassette tape is installed. Remove the cassette tape lid or cassette tape as follows:

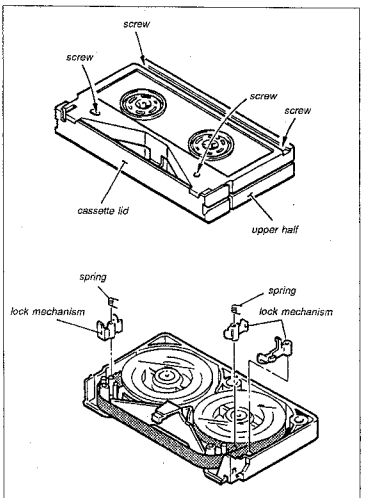
; Creating the blank cassette

(1) Remove the four fixing screws on the back of a cassette tape and remove the upper half of the cassette tape as shown in the figure.
(2) Remove the lock mechanism parts and the springs on the left and right.
(3) Remove the cassette lid from the upper half.
(4) Remove the cassette tape.
(5) Install the upper half on the lower half with the four fixing screws from the back side.



• **Creating the Cassette Tape without Lid**

(1) Remove the four fixing screws on the back of a cassette tape and remove the upper half of the cassette tape as shown in the figure.
(2) Remove the lock mechanism parts and the springs on the left and right.
(3) Remove the cassette lid from the upper half.
(4) Install the upper half on the lower half with the four fixing screws from the back side.

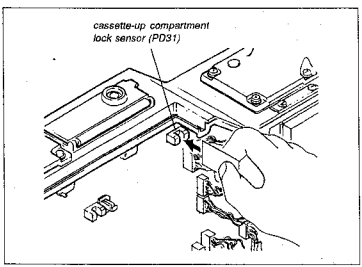


• **Creating the Alignment Tape without Lid**

(1) Remove the four fixing screws on the back of a cassette tape and remove the upper half of the alignment tape as shown in the figure.
(2) Remove the lock mechanism lock parts and the springs on the left and right.
(3) Remove the cassette lid from the upper half.
(4) Install the upper half on the lower half with the four fixing screws from the back side.

3. How to Operate the removed Mechanical Deck Block from the VTR

(1) Push down the Cassette-up Compartment.
(2) Insert a paper and so on into the Cassette-up Compartment Lock Sensor as Ref. No. PD31 near the CN52 on the MB-317/P board, and put the unit into the Cassette Lock Mode. The unit will start to thread by this operation.



5-1. GEAR ASSEMBLY POSITION ADJUSTMENT

Tool: Tension scale (50 g full scale)

Mode: Any mode is acceptable. (Put the unit into the threading mode.)

Check procedure:

(1) Push the Timing Belt in the direction of the arrow with a tension scale as shown in the figure.

(2) Check that the reading of the tension scale meets the required specification, when the clearance between the boss and the Timing Belt is about 0 mm.

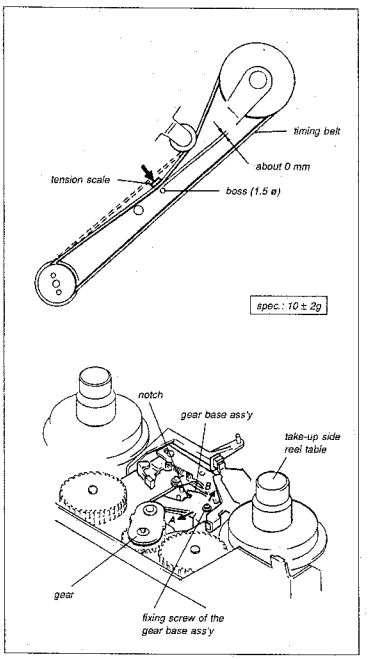
Adjustment procedure:

(1) Loosen the fixing screw of Gear Base Ass'y by one or two turns.

(2) Insert a flatblade screwdriver into the notch as shown in the figure, and move the Gear Base Ass'y in the direction as follows:
- When the reading of the tension scale is smaller than the required specifi- cation : in the direction of A
- When the reading of the tension scale is bigger than the required specifi- cation : in the direction of B

(3) Tighten the fixing screw of the Gear Base Ass'y.

(4) Perform steps (1) and (2). If the required specification is not satisfied, repeat the adjustment procedures (1) to (4).



5-2. PRESS LEVER POSITION CHECK

Tool: Blank cassette tape
Wire clearance gauge (0.1mm)

Setting: Remove the Cassette-up Compartment from the mechanical deck.

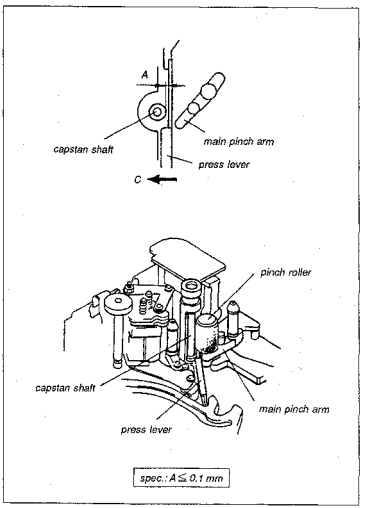
Mode: Play back the blank cassette tape and turn off the POWER switch.

Check procedure:

(1) Insert the blank cassette tape, put the unit into the PLAY mode, then turn off the POWER switch.

(2) When Pushing the Press Lever in the direction of the arrow C, check that clearance A between the capstan shaft and the Press Lever meets the required specification.

- When clearances A do not meet the required specification, perform the Pinch Press Lever Position Adjustment in Section 5-3.



5-3. PINCH PRESS LEVER POSITION ADJUSTMENT

Tool: Blank cassette tape
Wire clearance gauge (0.1, 0.2mm)

Mode: Play back and stop modes with the blank cassette tape.

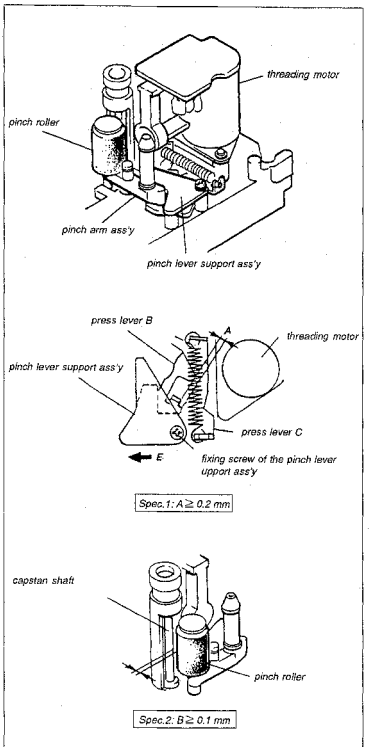
Check procedure:

(1) Insert the blank cassette tape and put the unit into the PLAY mode.
(2) Confirm that clearance A between Press Levers (B) and (C) meets the required specification. (Spec. 1)
(3) Put the unit into the STOP mode.
(4) Confirm that clearance B between the pinch roller and the capstan shaft meets the required specification. (Spec. 2)

Adjustment procedure:

- Adjust so that clearances A and B meet the required specifications.

(1) Insert the blank cassette tape and put the unit into the PLAY mode.
(2) Loosen the fixing screw of the Pinch Lever Support Ass'y by one turn.
(3) Adjust the assembly position so that clearance A between Press Levers (B) and (C) meets the required specification, when pushing the Pinch Lever Support Ass'y in the direction of arrow E.
(4) Tighten the fixing screw of the Pinch Lever Support Ass'y.
(5) Put the unit into the STOP mode and confirm that clearance B between the pinch roller and the capstan shaft meets the required specification.
   - When the specification is not satisfied, repeat Steps (1) through (5).



5-4. REEL FG OUTPUT LEVER CHECK

Tool: Blank cassette tape
Extension Board
Oscilloscope

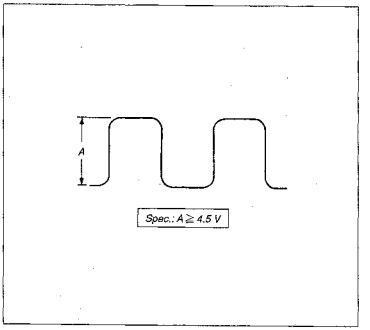
Setting: (1) Extend the SY-117C/P Board with the Extension Board.
(2) Connect the oscilloscope to the measuring point below.
Take-up reel FG:
CN 1-3 / Extension Board
Supply reel FG:
CN 1-4 / Extension Board

Mode: FF/REW mode

Check procedure:

(1) Insert the blank cassette tape and put the unit into the FF mode.
(2) Confirm that the output waveform of the take-up reel FG meets the required specification.
(3) Put the unit into the REW mode.
(4) Confirm that the output waveform of the supply reel FG meets the required specification.

- When the FG output waveform does not meet the required specification, replace the reel table or the sensor.



5-5. THREADING POSITION CHECK (SUPPLY SIDE)

Tool: Blank cassette tape

Mode: Put the unit into the threading completion mode and turn off the POWER switch.

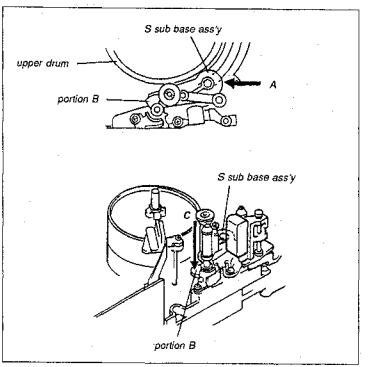
Check procedure:

(1) Insert the blank cassette tape, put the unit into the threading completion mode, then turn off the POWER switch.

(2) When Pushing the S Sub Base Ass'y in the direction of the arrow A with a flatblade precision driver (2mm), confirm that it will not move.

(3) When portion B of the S Sub Base ASS'y is pushed in the direction of the arrow C with a flatblade precision driver (2mm), confirm that it will not move in the vertical direction.

(4) Confirm that the specifications are satisfied by repeating Steps (1) through (3) two or three times.



5-6. THREADING POSITION CHECK (TAKE-UP SIDE)

Tool: Blank cassette tape

Mode: Put the unit into the threading completion mode and turn off the POWER switch.

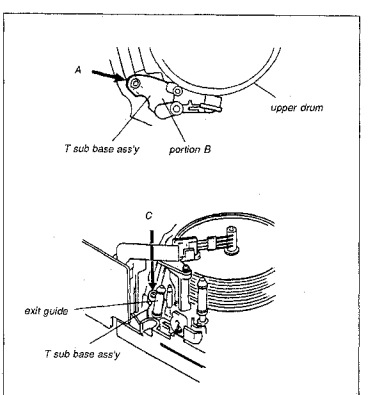
Check procedure:

(1) Insert the blank cassette tape, put the unit into the threading completion mode, and then turn off the POWER switch.

(2) When pushing the T Sub Base Ass'y in the direction of the arrow A with a flatblade precision driver (2mm), confirm that it will not move.

(3) When pushing portion B of the T Sub Base Ass'y in the direction of the arrow C with a flatblade precision driver (2mm), confirm that it will not move in the vertical direction.

(4) Confirm that the required specifications are satisfied by repeating Steps (1) through (3) two or three times.



5-7. IMPEDANCE ROLLER GUIDE II CLEARANCE ADJUSTMENT

Tool: Blank cassette tape
Wire clearance gauge (0.2, 0.4mm)

Mode: Put the unit into the threading completion mode and turn off the POWER switch.

Check procedure:

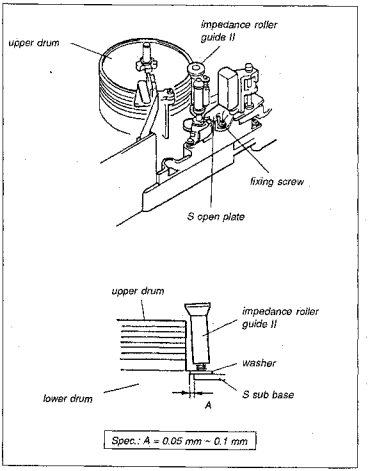
(1) Insert the blank cassette tape, put the unit into the threading completion mode, then turn off the POWER switch.

(2) Confirm that clearance A between the lower Drum Ass'y and S sub Base ass'y meets the required specification.

Adjustment procedure:

(1) Loosen the fixing screw of the S Open Plate by one turn and adjust the S Open Plate position so that clearance A meets the required specification.

(2) Perform Steps (1) and (2) in the check procedure and confirm that the required specification is satisfied.



5-8. TENSION REGULATOR OPERATING POSITION ADJUSTMENT

Tool: Cassette tape without a lid (BCT-30K) (15-minutes run portion from the tape beginnings)

Mode: Play back the cassette tape without a lid.

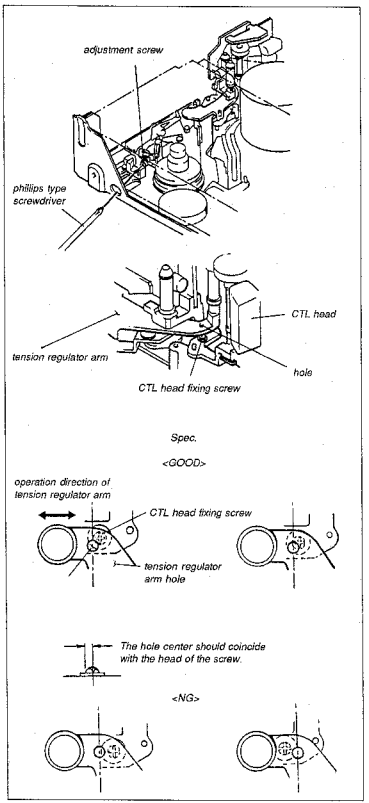
Check procedure:

(1) Confirm that the positional relationship between the Tension Regulator Arm's hole and the CTL Head Fixing Screw meets the required specification.

Adjustment procedure:

(1) Insert a phillips type screwdriver through the hole shown in the figure.

(2) Turn the adjustment screw so that the required specification is satisfied.



SECTION 6
TAPE RUN ALIGNMENT

(Preparations)

1. VTR's Mechanical Deck Block Adjustment

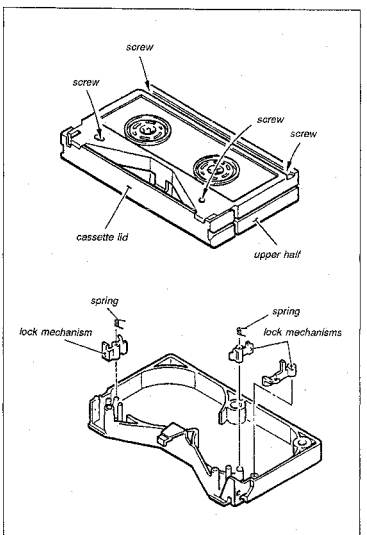
When the mechanical deck assy is removed from the unit for performing the tape run alignment, please refer to SECTION 5 LINK SYSTEM ALIGNMENT. 6-5. TAPE PATH ADJUSTMENT, 6-8. TRACKING ADJUSTMENT must be performed after mechanical deck assy is reinstalled in the unit.

2. Creating the Blank Cassette/Cassette Tape without Lid/Alignment Tape without Lid

Since the VTR is designed to compact size, some mechanical checks and adjustments cannot be performed when a cassette tape lid or cassette tape is installed. Remove the cassette tape lid or cassette tape as follows:

- Creating the blank cassette

(1) Remove the four fixing screws on the back of a cassette tape and remove the upper half of the cassette tape as shown in the figure.
(2) Remove the lock mechanism parts and the springs on the left and right.
(3) Remove the cassette lid from the upper half.
(4) Remove the cassette tape.
(5) Install the upper half on the lower half with the four fixing screws from the back side.

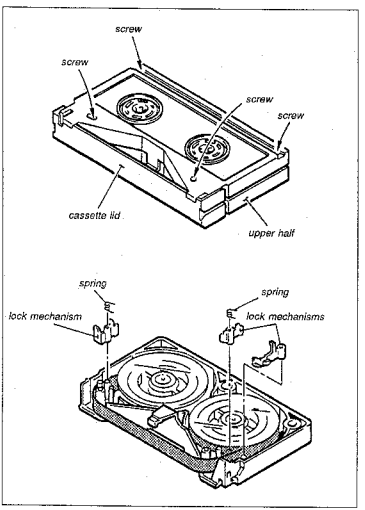


- **Creating the Cassette Tape without Lid**

(1) Remove the four fixing screws on the back of a cassette tape and remove the upper half of the cassette tape as shown in the figure.
(2) Remove the lock mechanism parts and the springs on the left and right.
(3) Remove the cassette lid from the upper half.
(4) Install the upper half on the lower half with the four fixing screws from the back side.

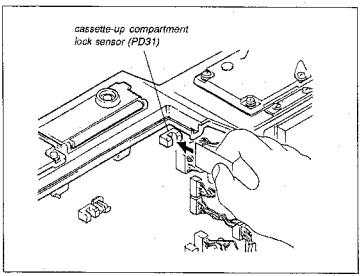
- **Creating the Alignment Tape without Lid**

(1) Remove the four fixing screws on the back of a cassette tape and remove the upper half of the alignment tape as shown in the figure.
(2) Remove the lock mechanism lock parts and the springs on the left and right.
(3) Remove the cassette lid from the upper half.
(4) Install the upper half on the lower half with the four fixing screws from the back side.



3. How to Operate the removed Mechanical Deck Block from the VTR

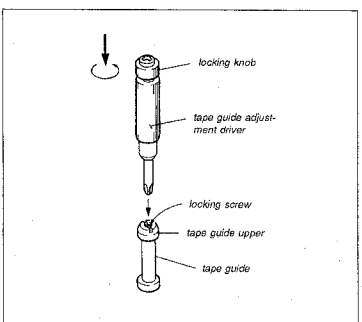
(1) Push down the Cassette-up Compartment.
(2) Insert a paper and so on into the Cassette-up Compartment Lock Sensor as Ref. No. PD31 near the CN52 on the MB-317/P board, and put the unit into the Cassette Lock Mode. The unit will start to thread by this operation.



4. Height Adjustment Procedure of the Tape Guide

When the height adjustment of the tape guide is performed in the Tape Run Alignment, use the tape guide adjustment driver (J-6321-500-A) prepared for the maintenance tool. After the height adjustment of the tape guide is completed, tighten the locking screw of the tape guide upper flange with the torque driver referring to Sec. 3-15.

(1) Put the flatblade of the tape guide adjustment driver in the (-)slot of the tape guide.
(2) Push down the locking knob of the adjustment driver and turn it counterclockwise about one turn.
(3) Turn the adjustment driver and adjust the height of the tape guide.
(4) After the adjustment is completed, tighten the locking screw of the tape guide upper flange referring to Sec. 3-15.
(5) Apply the locking compound to the locking screw. (Never apply the locking compound to the tape running surface of the tape guide, upper and lower flanges.)

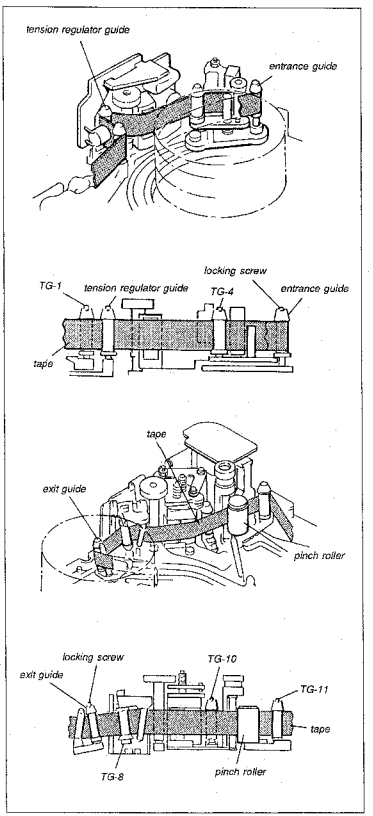


6-1. TAPE PATH ADJUSTMENT (PLAY MODE)

Tool: Cassette tape without a lid (BCT-30K)
Tape guide adjustment driver
Mode: Play back the cassette tape without a lid.
Check procedure:
(1) Insert the cassette tape without a lid (BCT-30K) and put the unit into the PLAY mode.
(2) Confirm that the tape runs without curl at the flanges of the TG-1, Tension Regulator Guide, TG-4, and Entrance Guide.
(3) Confirm that the tape runs without curl at the flanges of the Exit Guide, TG-8, TG-10, and TG-11.

Adjustment procedure:
- **Tape curl at the Entrance Guide or at the lead at the drum entrance side.**

(1) Loosen the Upper Flange Locking Screw of the Entrance Guide with tape guide adjustment driver by one or two turns.
(2) Turn and adjust the flange of the Entrance Guide so that no tape curl occurs at the Upper Flange of the Entrance Guide and the tape runs along the lead at the drum entrance side.
(3) Temporarily tighten the Upper Flange Locking Screw of the Entrance Guide.
(4) Check that the tape runs without curl at the flanges of the TG-1 Tension Regulator Guide, TG-4, and Entrance Guide.



- **Tape curl at the Exit Guide or at the lead at the drum exit side.**

(5) Loosen the Upper Flange Locking Screw of the Exit Guide with a tape guide adjustment driver by one or two turns.

(6) Turn with a tape guide adjustment driver and adjust the flange of the Exit Guide so that no tape curl occurs at the Upper Flange of the Exit Guide and the tape runs along the lead at the drum exit side.

(7) Temporarily tighten the Upper Flange Locking Screw of the Exit Guide.

(8) Insert the cassette tape without a lid (BCT-30K), put the unit into the PLAY mode, and confirm that the tape runs without curl at the flanges of each guide.

6-2. TAPE PATH CHECK (FF AND REW MODES)

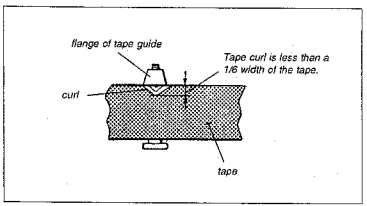
Tool: Cassette tape without a lid (BCT-30K) (at the complete tape end)

Mode: Fast-forward and rewind mode with the cassette tape without a lid.

Check procedure:

(1) Insert the cassette tape without a lid (BCT-30K), put the unit into the FF mode, and confirm that the tape runs without curl at the flanges of each guide. If occures, curl less than one sixth of the tape width can be acceptable.

(2) Put the unit into the REW mode and confirm that the tape runs without curl at the flanges of each guide. If occures, curl less than one sixth of the tape width can be acceptable.



- When the tape curl does not satisfy the required specification, perform the Tape Path Adjustment (PLAY mode) in Section 6-1 again.

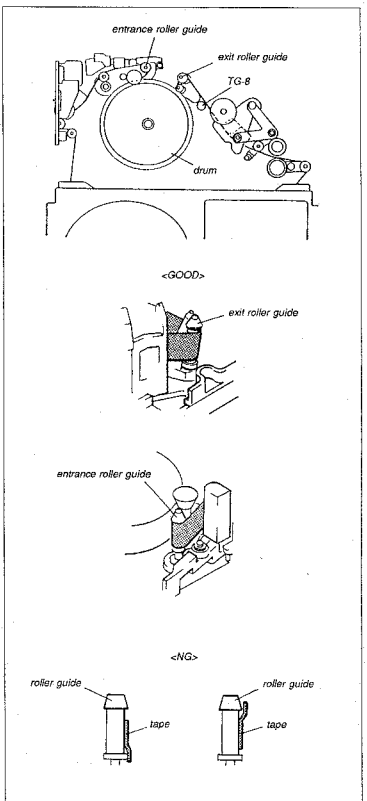
6-3. TAPE THREADING/UNTHREADING CHECK

Tool: Cassette tape without a lid (BCT-30K) (at the complete tape beginning)
Cassette tape without a lid (BCT-30K) (at the complete tape end)

Mode: Thread the cassette tape without a lid.

Check procedure:

(1) Thread the cassette tape without a lid at the complete tape beginning. Confirm that the tape is threaded at the upper and lower flanges of the Entrance and Exit Guide Rollers without curl at this time.
(2) Put up the mechanical deck block with the cassette tape in the upper position and drum in the lower position.
(3) Check that the threading and unthreading operations is smooth
(4) Repeat Steps (1) through (3) two or three times and confirm that the required specification is satisfied.
(5) Thread the cassette tape without a lid at the complete tape end.
(6) Check as in Step (1).
(7) Check as in Steps (1) through (4).



6-4. PLAY BACK TENSION ADJUSTMENT

Tool: Cassette tape without a lid (BCT-30K) (15-minutes run portion from the tape beginning)
Tentelometer: T2-H7-UMC

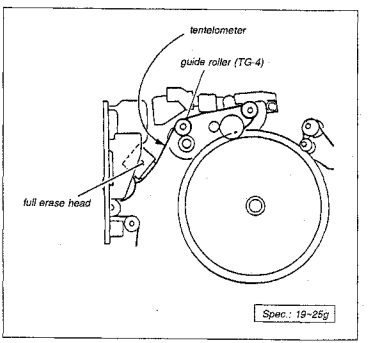
Mode: Play back the cassette tape without a lid

Check procedure:

(1) Confirm that the tension regulator operating position meets the required specification in Sec. 5-8. Tension Regulator Operating Position Adjustment.
(2) Insert the Tentelometer between Full Erase Head and Guide Roller (TG-4) as shown in the figure.
(3) Confirm that the reading meets the required specification.

Adjustment procedure:

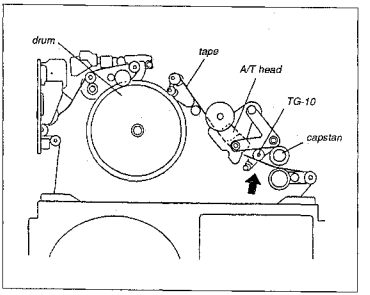
(1) Adjust the tension regulator operating position so that the specification is satisfied within the limits required in Sec. 5-8.
(2) When the required specification is not satisfied, replace the Supply Side Reel Table and Tension Regulator Band.
(3) Perform the Sec. 5-8. Tension Regulator Operating Position Adjustment.
(4) Perform the check procedure.



6-5. TAPE PATH ADJUSTMENT (AROUND THE PINCH ROLLER)

Tool: Cassette tape without a lid (BCT-30K)
Mode: Play back the cassette tape without a lid.
Check procedure:

(1) Insert the cassette tape without a lid (BCT-30K) and put the unit into the PLAY mode.
(2) Put the unit into the PLAY and STOP modes two or three times every two or three seconds and confirm that the tape path of the designated portion (between the A/T Head and capstan shaft) indicated by the arrow satisfies the specifications below.
  - No uneven tape tension occurs at the upper and lower edges of the tape.
  - When the pinch roller is pressed against the capstan shaft, any tape wrinkle occurring on the tape disappears within one second.
  - The tape is not damaged.
(3) After unthreading is completed, put the unit into the threading and PLAY modes two or three times.
(4) Put the unit into the PLAY mode and confirm that the tape path of the portion indicated by the arrow meets the required specifications in Step (2).

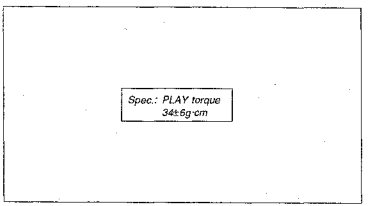


6-6. PLAY TORQUE CHECK

Tool: FWD torque cassette tape, SL-0003C
Mode: PLAY mode with torque cassette
Check procedure:

(1) Put the unit into PLAY mode with a torque cassette.
(2) After 2 or 3 seconds later, when the pinch roller is pressed against the capstan shaft, confirm that the indication of the meter on the T side of FWD torque cassette tape meets the required specification.

- When the required specification is not satisfied, replace the T Idler Ass'y.



6-7. REV TORQUE CHECK

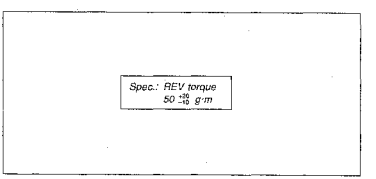
Tool: FWD torque cassette tape, SL-0003C
Servo remote control tool
Preparation:
Connect the connector on the servo remote control tool to CN2 on the SV-97A/P Board.
Mode: Insert the torque cassette tape and put the unit into the PLAY STOP REV mode.
Check procedure:

(1) Insert the torque cassette tape and switch over the mode in the following steps.
(Put the unit into the REV mode finally.)

PLAY → STOP → REV
(When putting the unit into the PLAY and STOP modes, push the PLAY and STOP buttons on the VTR, and when putting into the REV mode, push the REV botton on the servo remote control tool.)

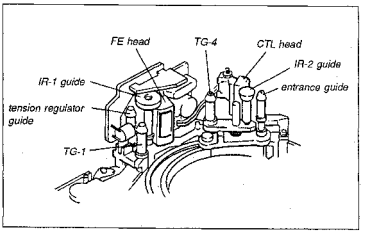
(2) After 2 or 3 seconds later, confirm that the indication of the meter on the S side of FWD torque cassette tape meets the required specification.

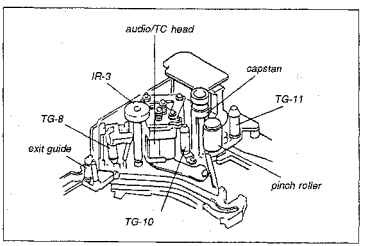
- When the required specification is not satisfied, replace the S Idler Ass'y.



6-8. TRACKING ADJUSTMENT

- The tape guides and heads at the drum entrance side in this adjustment are illustrated.
- The tape guides and heads at the drum exit side in this adjustment are illustrated.
- Before performing the tracking adjustment, clean the tape guide, stationary head, drum, capstan shaft, and pinch roller described above with a cloth moistened with cleaning fluid.
- The BVW-300's drum mounts four video heads for Y and C heads, respectively. The video tracking adjustment is made with channel 1 of the Y head as reference.
- After the tracking adjustment is completed, perform the adjustment as follows:
  Sec 6-1 Tape Path Adjustment
  (Play Mode)
  Sec 6-2 Tape Path Check
  (FF and REW Modes)
  Sec 6-9 CTL Head Height Adjustment
  Sec 6-10 CTL Head Position Adjustment
  Sec 6-12 TC Head Position Adjustment
  Sec 6-12 TC Head Position Adjustment
  (Check)
  Sec 6-13 Audio Head Height Adjustment
  Sec 6-14 Audio Head Phase Adjustment





Tool: Alignment tape without a lid (CR2-1B)
Dental mirror
Oscilloscope
Tape guide adjustment driver.
Servo remote control tool
Extension board

Setting: (1) Extend the VP-24/P Board with an extension board.
(2) Connect the connector of the servo remote control tool to the CN2 on the SV-97A/P Board.

Mode: Play back the alignment tape.

Check procedure:

(1) Connect the oscilloscope as follows:
CH-1: TP33 / Extension Board
(waveforms of Y head in CH1 to CH4)
CH-2: TP10 / Extension Board
(Switching Pulse)
TRIG: TP10 / Extension Board
(Switching Pulse)

(2) Insert the alignment tape CR2-1B and put the unit into the PLAY mode.

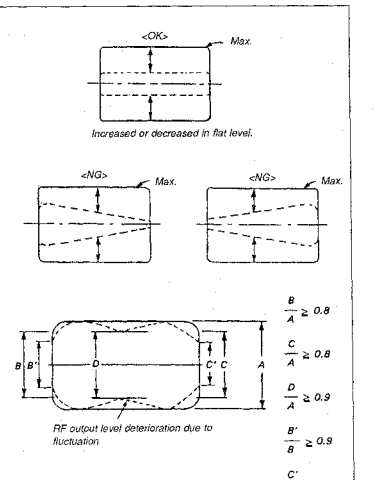
(3) Confirm that the waveforms of channels 1 through 4 of the Y head meets the required specifications of the Steps (4) and (5).

(4) Confirm that the RF envelope waveform maintains flat while the amplitude increases and decreases, when pushed the (+) or (–) button of the tracking control on a servo remote control tool.

(5) Check that the RF envelope waveform head-to-tape contact and fluctuation are within the specification at the maximum amplitude.

(6) Connect the oscilloscope as follows:
CH-1: TP31 / Extension Board
(waveforms of CH1 through CH4 of C head)
CH-2: TP10 / Extension Board
(Switching pulse)
TRIG: TP10 / Extension Board

(7) Confirm that the waveforms of channels 1 through 4 of the C head meets the required specifications of the Steps (4) and (5).



Adjustment procedure:

(1) Connect the oscilloscope as follows:
CH-1: TP33 / Extension Board
CH-2: TP10 / Extension Board
TRIG: TP10 / Extension Board

(2) Insert the alignment tape CR2-1B and put the unit into the PLAY mode.

(3) Push the (+) or (–) button of the tracking control on the servo remote control tool so that the RF envelope waveform is made 70 to 80% of the maximum amplitude.

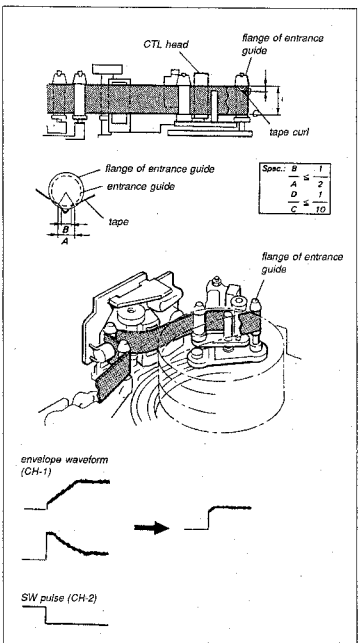
- To make a tracking adjustment at entrance side, perform Steps (4) through (8) plus Steps (14) and after. To make a tracking adjustment at exit side, perform Steps (9) through (13) plus Steps (14) and after.

(4) Loosen the Upper Flange Locking Screw of the Entrance Guide by one or two turns with the tape guide adjustment driver.

(5) Turn the upper flange of the Entrance Guide with the tape guide adjustment driver and adjust so that the required specifications below are satisfied.
(i) The RF envelope waveform at entrance side is flat.
(ii) No tape curl occurs at the upper flange of the Entrance Guide.
(iii) The tape touches the lead at the drum entrance side.

(6) Tighten the Upper Flange Locking Screw of the Entrance Guide with the tape guide adjustment driver.

(7) Put the unit into the EJECT and PLAY modes two or three times and confirm that the required specifications in Step (5) are satisfied.



(8) When raised the mechanical deck with the cassette tape in the upper position and the drum in the lower position, check that the RF envelope waveform at the entrance side meets the required specification.

(9) Loosen the Upper Flange Locking Screw of the Exit Guide by one or two turns with a tape guide adjustment driver.

(10) Turn the upper flange of the Exit Guide with the tape guide adjustment tool and adjust so that the required specifications below are satisfied.
  (i) The RF envelope waveform at exit side make flat.
  (ii) No tape curl occurs at the upper flange of the Exit Guide.
  (iii) The tape touches the lead at the drum exit side.

(11) Tighten the Upper Flange Locking Screw of the Exit Guide with the tape guide adjustment driver.

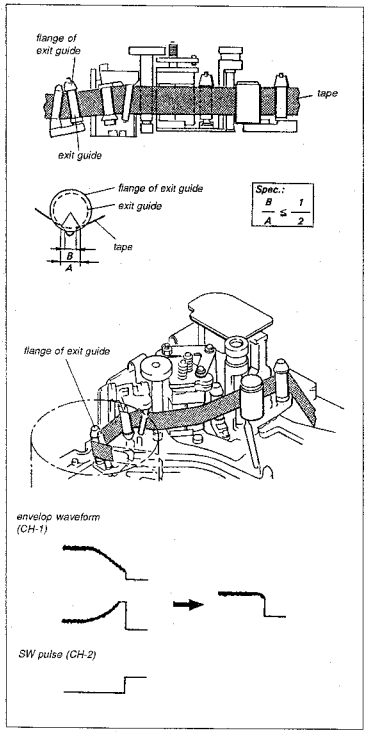
(12) Repeat the EJECT and PLAY modes two or three times and confirm that Step (10) is satisfied.

(13) When raised the mechanical deck with the cassette tape in the upper position and the drum in the lower position, confirm that the RF envelope waveform at the exit side meets the required specification.

(14) Connect the oscilloscope as follows:
CH-1: TP31 / Extension Board
CH-2: TP10 / Extension Board
TRIG: TP10 / Extension Board

(15) When pushed the (+) or (–) button of the tracking control on the servo remote control tool, confirm that the RF envelope waveform is increased or decreased in a flat level.

(16) Perform the adjustments as follows:
Sec 6-1 Tape Path Adjustment (Play Mode)
Sec 6-2 Tape Path Check (FF and REW Mode)



6-9. CTL HEAD HEIGHT ADJUSTMENT

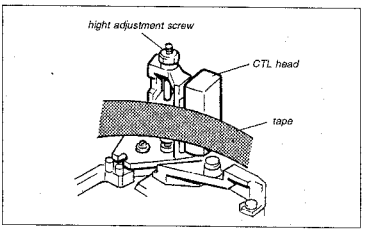
Tool: Alignment tape without a lid (CR5-1A)
Oscilloscope
Extension Board

Setting: (1) Extend the SV-97A/P Board with an extension board.
(2) Connect the oscilloscope as follows:
CH-1:TP38 / Extension Board

Mode: Play back the alignment tape.

Adjustment procedure:

(1) Play back a 1 kHz audio signal which is recorded on the CTL track of the alignment tape.
(2) Turn the hight adjustment screw so that the output waveform is maximized.



6-10. CTL HEAD POSITION ADJUSTMENT

- The BVW-300's drum mounts four video heads for Y and C heads, respectively. The CTL head position adjustment is made with channel 1 of the Y head as reference.

Tool: Alignment tape without a lid (CR2-1B)
Oscilloscope
Extension Board
Servo remote control tool

Setting: (1) Extend the VP-24/P Board with an extension board.
(2) Connect the connector of the servo remote control tool to the CN2 of the SV-97A/P Board.
(3) Connect the oscilloscope as follows:
CH-1: TP33 /Extension Board
CH-2: TP10 / Extension Board
TRIG: TP10 / Extension Board

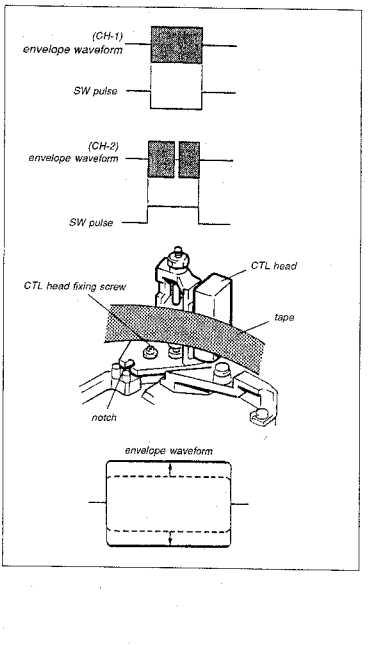
Mode: Play back the alignment tape.

Check procedure:

(1) Insert the alignment tape CR2-1B and put the unit into the PLAY mode.
(2) When pushed the (+) or (–) button of the tracking control on the servo remote control tool, confirm that the RF envelope waveform is decreased. (Perform the adjustment if the output waveform is increased.)
(3) Confirm that the relationship between the switching pulse and RF envelope waveform meets the required specification.

Adjustment procedure:

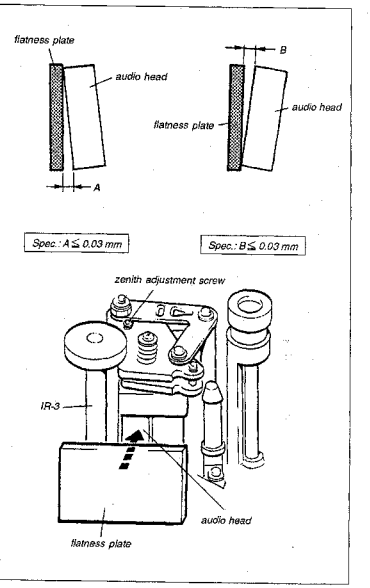
(1) Remove the servo remote control tool.
(2) Loosen the fixing screw of CTL head by 1/2 turn.
(3) Insert a flatblade 3mm screwdriver into the notch of the CTL Head Mounting Bracket and adjust the CTL head position so that the RF envelope waveform is maximum.
(4) Tighten the CTL head fixing screw.
(5) Check according to the check procedure.



6-11. AUDIO HEAD ZENITH ADJUSTMENT

Tool: Flatness plate
Mode: EJECT mode
Check procedure:
(1) Put the flatness plate onto the IR-3 guide and audio head.
(2) When the flatness plate is pressed onto the IR-3 guide, confirm that the clearance between the flatness plate and audio head meets the required specification.

Adjustment procedure:
(1) Adjust the Zenith Adjustment Screw so that the specification is satisfied.
(2) Adjust as follows:
Sec 6-14 Audio Head Phase Adjustment
Sec 6-12 TC Head Position Adjustment
Sec 6-13 Audio Head Height Adjustment
Sec 6-12 TC Head Position Adjustment



6-12. TC HEAD POSITION ADJUSTMENT

Tool: Alignment tape without a lid (CR2-1B)
Extension Board

Setting: (1) Extend the SV-97A/P Board with an extension board.
(2) Connect the oscilloscope as follows:
CH-1: TP38 / Extension Board (CTL waveform)
CH-2: TP2 / TB-5 Board (TC waveform)
TRIG: TP20 / Extension Board (1/2 VD)

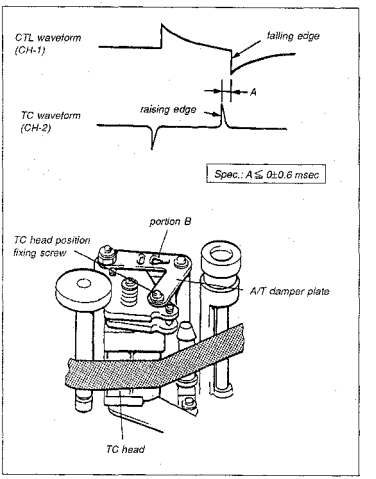
Mode: Play back the alignment tape.

Check procedure:

(1) Insert the alignment tape CR2-1B and put the unit into the PLAY mode.
(2) Confirm that the relationship between the phase at the falling edge of the CTL waveform and that at the raising edge of the TC waveform meets the required specification.

Adjustment procedure:

(1) Loosen the TC Head Position Fixing Screw by one or two turns.
(2) Insert a flatblade 3mm screwdriver into portion B of the A/T Damper Plate and adjust the TC head position so that the required specification is satisfied.
(3) Tighten the TC Head Position Fixing Screw and recheck.



6-13. AUDIO HEAD HEIGHT ADJUSTMENT

Tool: Alignment tape without a lid (CR5-1A)
Extension Board

Setting: (1) Extend the AU-97/P Board with an extension board
(2) Connect the oscilloscope as follows:
CH-1: TP105 / AU-97/P Board
CH-2: TP205 / AU-97/P Board

Mode: Play back the alignment tape.

Check procedure:

(1) Play back a 1 kHz/0 dB audio signal on the alignment tape.
(2) Pushing up and pressing down the tape of the illustrated portion between the audio head and IR-3 Guide. Confirm that the output waveform is desereaed without increasing. (Perform the adjustment when the output waveform is increased.)

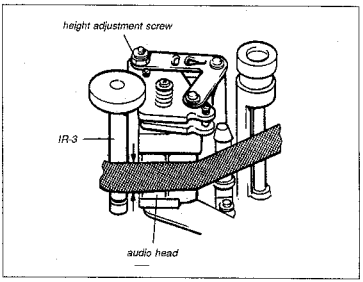
Adjustment procedure:

- When the output waveform is increased by pushing up the tape.

(1) Turn the Height Adjustment Screw clockwise so that the output waveform is maximum.

- When the output waveform is increased by pressing down the tape.

(2) Turn the Height Adjustment Screw counterclockwise so that the output waveform is maximum.



6-14. AUDIO HEAD PHASE ADJUSTMENT

Tool: Alignment tape without a lid (CR5-1A)
Extension Board

Setting:

(1) Extend the AU-97/P Board with an extension board.
(2) Connect the horizontal and vertical terminals of the oscilloscope to TP105 and TP205 on the AU-97/P Board.
(3) Play back a 1 kHz audio signal on the alignment tape.
(4) Adjust the oscilloscope for horizontal and vertical amplitudes to 6cm of a lissajous waveform.

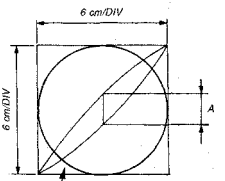
Mode: Play back the alignment tape.

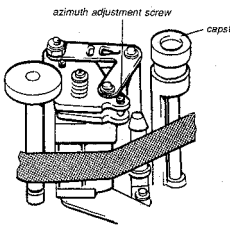
Check procedure:

(1) Play back a 1 kHz audio signal on the alignment tape.
(2) Confirm that the phase difference meets the required specification.
(3) Play back a 10 kHz/-10 dB audio signal on the alignment tape.
(4) Confirm that the phase difference meets the required specification.

Adjustment procedure:

(1) Play back 1 kHz and 10 kHz audio signals on the alignment tape.
(2) Adjust the Azimuth Adjustment Screw so that both specifications are satisfied.





Spec.: 1 kHz: A ≦ 0.52 cm (5°)
10 kHz: A ≦ 0.52 cm (5°)

6-15. PB SWITCHING POSITION ADJUSTMENT

Tool: Alignment tape, CR2-1B
Two extension boards

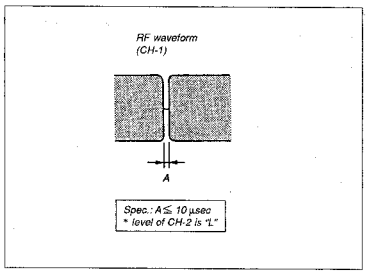
Setting:

(1) Set the S1/VP-24/P to the OFF position.
(2) Extend the SV-97A/P board with an extension board.
(3) Extend the VP-24/P board with an extension board.
(4) Connect the oscilloscope as follows:
CH-1: TP33/Extension board (VP-24/P)
CH-2: TP10/Extension board (SV-97A/P)
TRIG: TP20/Extension board (SV-97A/P)

Mode: Play back the alignment tape.

Adjustment procedure:

(1) Adjust the RV4/SV-97A/P (H-5) so that the portion A of the CH-1 waveform is minimized during the level of CH-2 is "L".
(2) Adjust the RV3/SV-97A/P (I-5) so that the specification is satisfied. If the level of CH-2 is "H", perform step (1) again.
(3) After the adjustment is completed, set the S1/VP-24/P to the ON position.



6-16. BRUSH ADJUSTMENT

6-16-1. Brush Position Adjustment

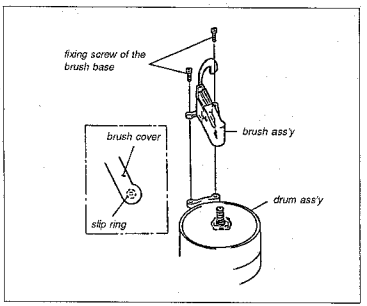
Mode: EJECT

Check procedure:

(1) When looking from the upper portion of the Slip Ring, confirm that the Slip Ring places the center of the brush cover molding pin mark as shown in the figure.

Adjustment procedure:

(1) Loosen the two fixing screws of the Brush Base, and adjust the position of the brush base so that the specification is satisfied.



6-16-2. Brush Height Adjustment

Mode: EJECT

Check procedure:

(1) Confirm that the Brush is parallel to the Slip Ring Groove.

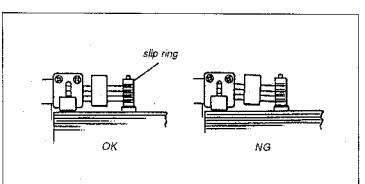
Adjustment procedure:

(1) Remove the Brush Base from the unit as described in Sec. 6-16-1. Brush Position Adjustment.

(2) Remove the Brush Cover from the Brush Base.

(3) Install the Brush Base on the unit, and loosen the two fixing screws of the Brush Base and adjust so that the specification is satisfied.

(4) After adjustment, install the Brush Cover and adjust the brush position as described in Sec. 6-16-1.

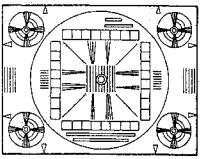


SECTION 7
CAMERA SYSTEM ALIGNMENT

7-1. PREPARATION

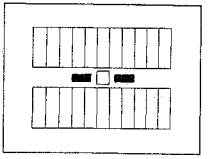
7-1-1. Tools and Measuring Instruments

J-6026-100-A	Resolution Chart



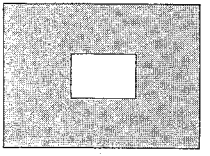
J-6026-130-1	Gray Scale Chart

Stick the velvet (black) at the both sides of white pattern in the center so as to avoid the light leakage.

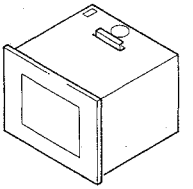


White Window Chart

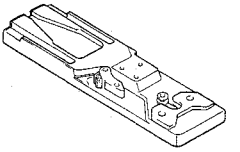
Make a hole in the center of black paper as shown in the figure.



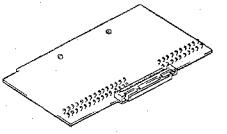
J-6029-140-A	Pattern Box PTB-500 (90 to 240Vac) with Color-bar Chart attached



Standard Products	Tripod Adaptor



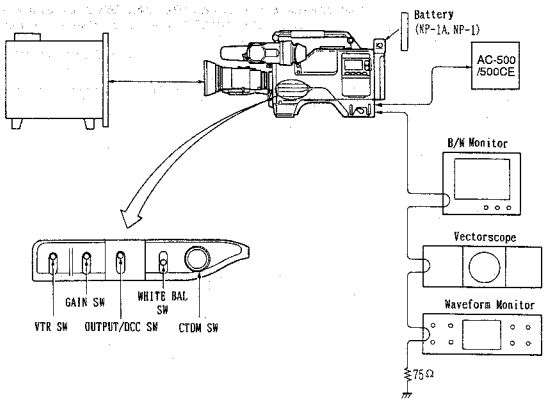
A-7520-314-A	Extension Board (EX-148)



- AC Adaptor (Sony AC-500/500CE) or Battery (NP-1A, NP-1)

【Measuring Instruments】
- Oscilloscope
- Waveform Monitor
- Vectorscope
- Frequency Counter
- Digital Voltmeter
- B/W Monitor (H. Resolution: more than 700 TV lines)
- Color Motor
- CF Pulse Generator

7-1-2. Connection and Initial Setting



- VBS signal output is available from VIDEO OUT 1 connector or VIDEO OUT 2 connector. When connected with the VA-500/500CE playback adaptor (option), VBS output is available from VIDEO OUT1 on the side panel.
- VBS signal output to the connector of playback adaptor, output signal from VIDEO OUT 2 on the rear panel and output sigual from 26-pin connector ou the BKW-402 are same signal. When connected with the playback adaptor and terminated by 75Ω, never terminate with 75Ω at VIDEO OUT 2 connector, it not correct level VBS signal cannot obtain.

1. Before adjustments, set the POWER switch to ON position, the VTR switch to the SAVE position and warm up for 10 minutes.
2. Reset the compensation data in the microcomputer. (Refer to Sec. 7-1-3.)
3. Set the switches and controls of the unit s follows.

[Side Panel]	
POWER switch	: ON
VTR switch	: SAVE
GAIN switch	: 0
OUTPUT/DCC switch	: CAM/OFF
WHITE BAL switch	: PRST
FILTER selector	: 1 (3200K)
IRIS AUTO/MANU selector	: MANU
IRIS control	: CLOSE
[IE-30P Board]	
S1 (DTL ON/OFF)	: OFF

7-1-3. Precautions on Adjustments

• Boards Extension
When the boards are extended, be sure to turn the POWER switch to OFF position.

• Procedure of Resetting Compensation Data
Before 7-4-10. Black Set Pedestal Adjustment and 7-4-11. Flare Adjustment are carried out, the compensation data in the microcomputer must be reset in following order.

1. S2 (MEMORY RESET)/ AT-49A board → RESET
2. The compensation data is reset and "MEMORY RESET" is displayed on the Viewfinder Monitor for 5 minutes.
3. S2 (MEMORY RESET) / AT-49A board → OPERATE

(NOTE) When the AUTO W/B BAL switch is not set to BLK or WHT, the compensation data remains cleared (initial condition).
When the S2 (MEMORY RESET) / AT-49A board is set to RESET, the compensation data is reset whenever to POWER switch is set to OFF. Set the S2 to RESET during adjustment.

• Partial Adjustment
Overall adjustment is described in Sec. 7-2. Camera Block Power Supply Alignment to Sec. 7-6. Auto System Adjustment. When performing part adjustment, refer to Sec. 7-8. Partial Adjustment.

• Earthing Point
Use the GND terminal (TP1, TP2) on the extension board, unless otherwise specified.
When the SY-117CP board is extended by the extension board, use the TP1 as GND terminal TP1 is colored with silver, and TP2 is gold.

7-2. CAMERA BLOCK POWER SUPPLY ADJUSTMENT

- The adjustment is not necessary if error is within ±3% of rated voltage.
- When performing this adjustment, be sure to readjust all of the following (to Sec. 7-7. Viewfinder System Adjustment).

7-2-1. +8.5V Adjustment and Each Voltage Check

- Setting

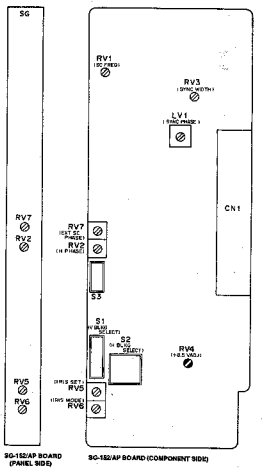
Equipment: Digital Voltmeter	Board: SG-152AP board

- Preparation

- To be extended; SG-152AP board

- Adjustment procedures

1. • Test point : TP3(GND:TP1)/Extension board
   • Adj. point : ⊘ RV4 (+8.5V ADJ)/SG-152AP
   • Spec. : +8.5 ± 0.1Vdc
2. • Test point : TP47 (GND:TP1)/Extension board
   • Spec. : +4.6 ± 0.1Vdc
   (Confirm)
3. • Test point : TP49 (GND:TP1)/Extension board
   • Spec. : −4.5 ± 0.1Vdc
   (Confirm)
4. • Test point : TP5 (GND:TP1)/Extension board
   • Spec. : +4.7 ± 0.1Vdc
   (Confirm)



7-3. SYNCHRONIZING SIGNAL SYSTEM ADJUSTMENT

- Before adjustment, set the POWER switch to ON position and warm up for 10 minutes.
- Make sure that the no signal is put into the TC LOCK VIDEO IN terminal.

7-3-1. Subcarrier Frequency Adjustment

- Setting

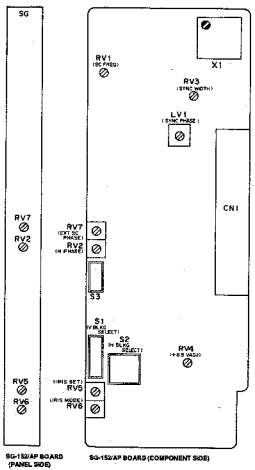
Equipment: Frequency Counter	Board: SG-152AP board

- Preparation

- To be extended; SG-152AP board
- Connect the inductor more than 100μH in series to between the probe of Counter and Test Point.

- Adjustment procedures

1. • Test point : TP21(GND:TP22)
   /Extension board
   • Adj. point : ⊘ X1(SC FREQ)/SG-152AP
   • Spec. : 4,433,619 ± 5Hz



7-3-2. SYNC Width Adjustment

• Setting

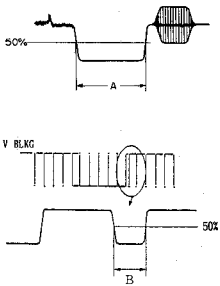
Equipment: Waveform Monitor	Board: SG-152AP board

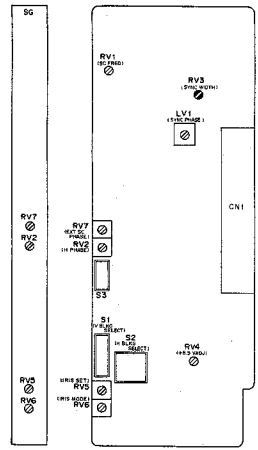
• Preparation

• To be extended; SG-152AP board
• S3 (Y/G SELECT) / EN/-79P : ENC

• Adjustment procedures

• Test point : Waveform Monitor
• Adj. point : ● RV3(SYNC WIDTH)/SG-152AP
• Spec. : 1. SYNC width A = 4.7 ± 0.1µs
2. Confirm that the equalizing pulse width B is 2.3 ± 0.1µs.





7-3-3. SYNC Phase Adjustment

• Setting

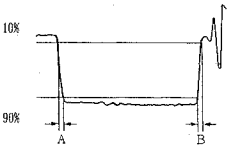
Equipment: Waveform Monitor	Board: SG-152AP board

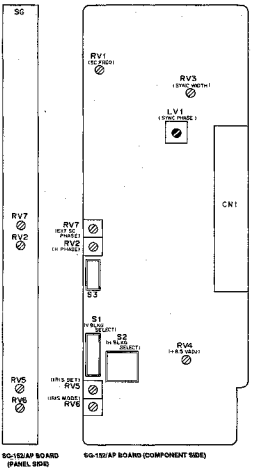
• Preparation

- To be extended; SG-152AP board
- Confirm that S3 (Y/G SELECT) / EN-79P is set to ENC.

• Adjustment procedures

- Test point : Waveform Monitor
- Adj. point : ⊘ LV1(SYNC PHASE)
- Spec. : A = B = 0.25 ± 0.05µs





7-3-4. Burst Flag Adjustment

• Setting

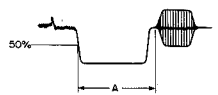
Equipment: Waveform Monitor	Board: EN-79P board

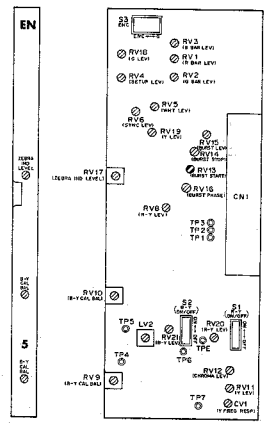
• Preparation

• To be extended; EN-79P board
• Confirm that S3 (Y/G SELECT) / EN-79P is set to ENC.

• Adjustment procedures

• Test point : Waveform Monitor
• Adj. point : ⊘ RV13(BURST START)
/EN-79P
• Spec. : A = 5.6 ± 0.1µs





7-3-5. H BLKG Adjustment

• Setting

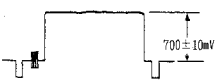
Equipment: Waveform Monitor	Board: SG-152AP board

• Preparation

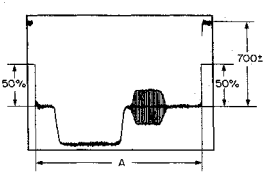
- To be extended; SG-152AP board
- Confirm that S3 (Y/G SELECT) / EN-79P is set to ENC.
- AUTO/MANU switch Pattern Box : AUTO
- Set the zoom control to TELE and shoot the white area of the white window chart.

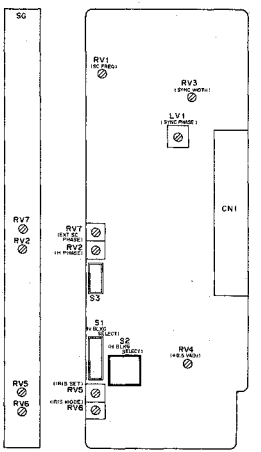
• Adjustment procedures

1. • Test point : VIDEO OUT TERMINAL
   • Adj. point : IRIS CONTROL
   • Spec. : 700 ± 10 mV



2. • Test point : VIDEO OUT TERMINAL
   • Adj. point : ● S2 (H BLKG SELECT) /SG-152AP
   • Spec. : A = 12.05 ± 0.25µs





7-3-6. INT SC Phase Adjustment

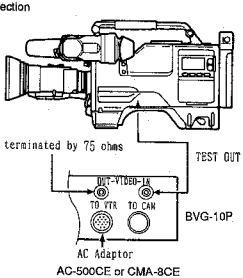
- Note

This step describes how to adjust the INT SC Phase using the CF pulse generator (Sony BVG-10P), if any equipment except BVG-10P is used, you should refer to procedures below for your information.

- Setting

Equipment:	Board: SG-152AP board

- Connection

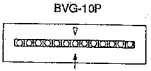


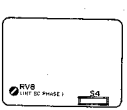
- Preparation

- Selector of BVG-10P : SOURCE CHECK

- Adjustment procedures

- Adj. point : RV8 (INC SC PHASE)/SG-157P
- Spec. : Adjust so that the LED lamp of BVG-10P lights at center.





7-4. VIDEO SIGNAL SYSTEM ADJUSTMENT

7-4-1. DC Balance Adjustment

• Setting

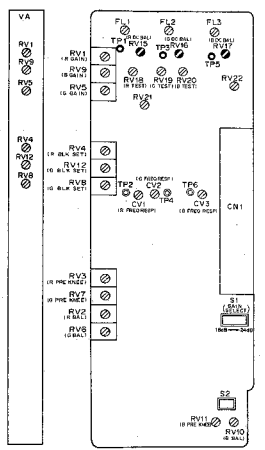
Equipment: Dualtrace Oscilloscope	Board: VA-104 board

• Preparation

• To be extended; VA-104 board
• RV1 (R GAIN), RV5 (G GAIN), RV9 (B GAIN) / VA-104 : mechanical center

• Adjustment procedures

• Test point : G DC Balance : TP3/VA-104
R DC Balance : TP1/VA-104
B DC Balance : TP5/VA-104
(GND: E1/VA-104)
• Adj. point : ✪ RV16 (G DC BAL) /VA-104
✪ RV15 (R DC BAL) /VA-104
✪ RV17 (B DC BAL) /VA-104
• Spec. : 1.2 ± 0.1Vdc
TRIG: HD (TP18/Extension board)



• Note

• After adjustment is completed, be sure to perform 7-4-2. VA Gain Adjustment.

7-4-2. VA Gain Adjustment

• Note

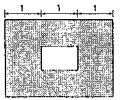
- This adjustment should be performed after 7-4-1. DC Balance Adjustment is completed.
- Use a white pattern chart for this adjustment.
  Adjust the lighting so that the white area is exactly 3200K of color temperature.
- When the pattern box is used, well maintained pattern box should be used.

• Setting

Equipment: Dualtrace Oscilloscope	Board: VA-104 board

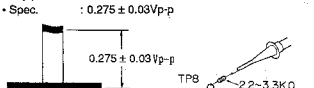
• Preparation

- To be extended; VA-104 board
- Adjust the iris control and shoot the chart as shown below.
- Gain Selector: 0



• Adjustment procedures

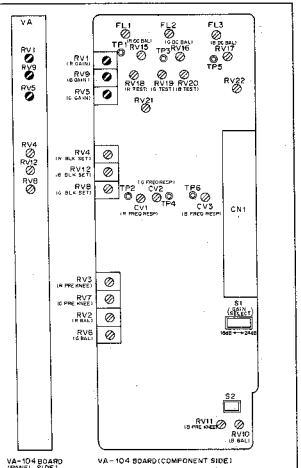
1. • Test point : TP8 (GND:TP9)
   /Extension board
   • Adj. point : Iris control
   • Spec. : 0.275 ± 0.03Vp-p



• When measuring the TP8, connect the resistance (2.2~3.3 kΩ) between the probe and the TP8 connector.

2. • Test point : G Gain : TP39/Extension board
   R Gain : TP41/Extension board
   G Gain : TP43/Extension board
   • Adj. point : ● RV5 (G GAIN)/VA-104
   ● RV1 (R GAIN)/VA-104
   ● RV9 (B GAIN)/VA-104
   • Spec. : A = 0.50 ± 0.01V

TRIG: HD (TP18/Extension board)



7-4-3. Test Signal Waveform Adjustment

• Note

• This adjustment should be performed after 7-4-2. VA Gain Adjustment is completed.

• Setting

Equipment: Dualtrace Oscilloscope	Board: VA-104 board

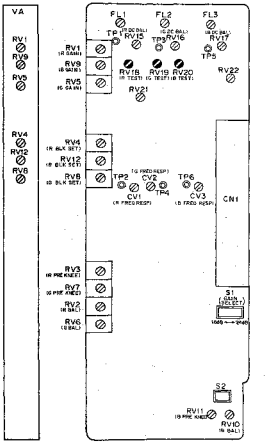
• Preparation

• To be extended; VA-104 board • S3 (TEST SAW) / SG-152AP : ON

• Adjustment procedures

• Test point	: G TEST TP39/Extension board R TEST TP41/Extension board B TEST TP43/Extension board
• Adj. point	: ✪ RV19 (G TEST)/VA-104 ✪ RV18 (R TEST)/VA-104 ✪ RV20 (B TEST)/VA-104
• Spec.	: A = 0.50 ± 0.01V

TRIG: HD (TP18/Extension board)



• Note

• After adjustment is completed, set the S3 to OFF.

7-4-4. Pre Knee Adjustment

• Setting

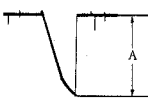
Equipment: Dualtrace Oscilloscope	Board: VA-104 board

• Preparation

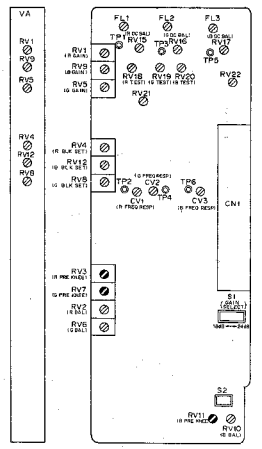
- To be extended; VA-104 board
- Confirm that S1 (GAIN SELECT) / VA-104 is set to +18dB.
- S3 (TEST SAW) / SG-152: ON
- GAIN selector: 18

• Adjustment procedures

- Test point : G PRE KNEE
  TP39/Extension board
  R PRE KNEE
  TP41/Extension board
  B PRE KNEE
  TP43/Extension board
- Adj. point : ✪ RV7 (G PRE KNEE)/VA-104
  ✪ RV3 (R PRE KNEE)/VA-104
  ✪ RV11 (B PRE KNEE)/VA-104
- Spec. : A = 1.65 ± 0.02V



TRIG: HD (TP18/Extension board)



• Note

- After adjustment is completed, set the S3 to OFF, GAIN selector to 0.

7-4-5. Modulator Balance Adjustment

• Setting

Equipment: Dualtrace Oscilloscope	Board: VA-104 board

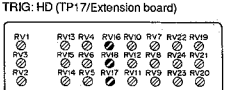
• Preparation

- To be extended; VA-104 board
- Set the iris control to CLOSE.

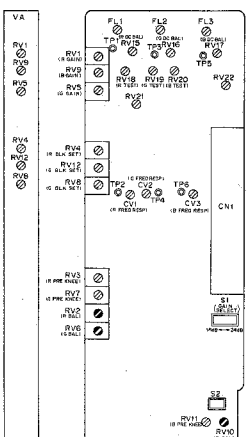
• Adjustment procedures

- Test point : G Balance
  TP39/Extension board
  R Balance
  TP41/Extension board
  B Balance
  TP43/Extension board
- Adj. point : ✪ RV6 (G BAL)/VA-104
  ✪ RV17(G-V MOD SAW) /VA-104, IC15
  ✪ RV2 (R BAL)/VA-104
  ✪ RV16(R-V MOD SAW) /VA-104, IC15
  ✪ RV10 (B BAL)/VA-104
  ✪ RV18(B-V MOD SAW) /VA-104, IC15
- Spec. : Adjust the volumes so that the waveform does not change even if the volume is turned both clockwise and counter-clockwise.

TRIG: HD (TP17/Extension board)



HIC (IC15)
(COMPONENT SIDE) –On the VA-104 Board–



• Note

- After adjustment is completed, be sure to perform 7-4-9. White Shading Adjustment.

7-4-6. Gamma Balance Adjustment

• Note

• This adjustment should be performed after 7-4-3. Test Signal Waveform Adjustment is completed.

• Setting

Equipment: Dualtrace Oscilloscope	Board: PR-132A board

• Preparation

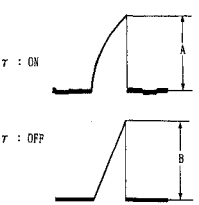
• To be extended; PR-132A board
• S3 (TEST SAW)/SG-152AP: ON
• S5 (WHITE CLIP & KNEE ON/OFF)/PR-132A: OFF

• Adjustment procedures

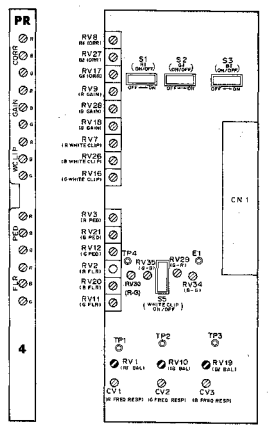
• Test point : G gamma balance
TP31/Extension board
R gamma balance
TP29/Extension board
B gamma balance
TP33/Extension board

• Adj. point : ● RV10 (G γ BAL)/PR-132A
S2 (G γ) /PR-132A
● RV1 (R γ BAL)/PR-132A
S1 (R γ) /PR-132A
● RV19 (B γ BAL)/PR-132A
S3 (B γ) /PR-132A

• Spec. : Adjust RVs so that the peak level does not fluctuate irrespective of their switch ON/OFF.



TRIG: HD (TP14/Extension board)



• Note

• After adjustment is completed, set the switches as follows: Switches on the PR-132A board
S1 (R γ): ON
S2 (G γ): ON
S3 (B γ): ON
S5 (WHITE CLIP & KNEE ON/OFF): ON
• Switch on the SG-152AP board
S3 (TEST SAW): OFF

7-4-7. Carrier Balance Adjustment

• Setting

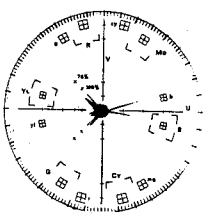
Equipment: Vectorscope	Board: EN-79P board

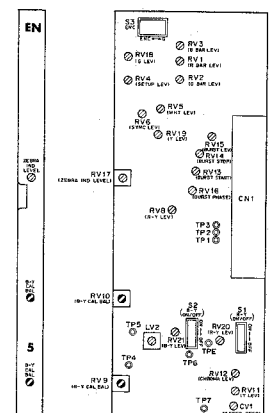
• Preparation

• OUTPUT/DCC SW (side panel): BARS/OFF

• Adjustment procedures

• Test point : VIDEO OUT Terminal
• Adj. point : ⊘ RV9 (R-Y CAL BAL)/EN-79P
⊘ RV10 (B-Y CAL BAL)/EN-79P
• Spec. : Turn RVs so that the black luminescent spot is in the center of the vectorscope.





• Note

• When a black luminescent spot cannot be discriminated because of two or more luminescent spots, turn RV1 (R BAR LEV) on the EN-79P board. The black luminescent spot will not move. After RV1 is turned, make the 7-4-17 Color Bar Adjustment.

7-4-8. Black Shading Adjustment

• Setting

Equipment: Dualtrace Oscilloscope	Board: VA-104 board

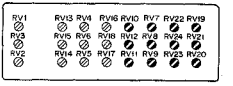
• Preparation

- To be extended; VA-104 board
- Set the iris control to CLOSE.
- GAIN selector (side panel): 18

• Adjustment procedures

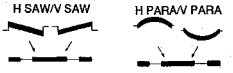
• Test point : TP39/Extension board (G)
TP41/Extension board (R)
TP43/Extension board (B)

• Adj. point : (G)
H SAW : ⊘ RV8/VA-104 (IC15)
V SAW : ⊘ RV20/VA-104 (IC15)
H PARA : ⊘ RV11/VA-104 (IC15)
V PARA : ⊘ RV23/VA-104 (IC15)
(R)
H SAW : ⊘ RV7/VA-104 (IC15)
V SAW : ⊘ RV19/VA-104 (IC15)
H PARA : ⊘ RV10/VA-104 (IC15)
V PARA : ⊘ RV22/VA-104 (IC15)
(B)
H SAW : ⊘ RV9/VA-104 (IC15)
V SAW : ⊘ RV21/VA-104 (IC15)
H PARA : ⊘ RV12/VA-104 (IC15)
V PARA : ⊘ RV24/VA-104 (IC15)



MIC (IC15)
(COMPONENT SIDE) – On the VA-104 Board –

• Spec. :



H TRIG: HD (TP18/Extension board)
V TRIG: VD (TP17/Extension board)

1. When a 10k-ohm resistor is connected to the probe, the waveform can be easily observed on the oscilloscope.
2. When the black shading occurs, adjust the RVs so that the waveform is flat.

• Note

- After adjustment is completed, set the GAIN selector (side panel) to 0.

7-4-9. White Shading Adjustment

• Note

• This adjustment should be performed after the 7-4-5 Modulator Balance Adjustment is completed.

• Setting

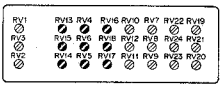
Equipment: Dualtrace Oscilloscope	Board: VA-104 board

• Preparation

• To be extended; VA-104 board
• S5 (WHITE CLIP & KNEE ON/OFF) / PR-132A: OFF
• Set the zoom control to TELE and shoot the white area of the white window chart.

• Adjustment procedures

1. • Test point : VIDEO OUT Terminal
   • Adj. point : IRIS control
   • Spec. : 700 ± 10 mV



H1C (1C15)
(COMPONENT SIDE) – On the VA-104 Board –

2. • Test point : TP39/Extension board (G)
   TP41/Extension board (R)
   TP43/Extension board (B)
   • Adj. point : (G)
   H MOD SAW : RV5/VA-104 (IC15)
   V MOD SAW : RV17/VA-104 (IC15)
   V EXT SAW : RV14/VA-104 (IC15)
   : (R)
   H MOD SAW : RV4/VA-104 (IC15)
   V MOD SAW : RV16/VA-104 (IC15)
   V EXT SAW : RV13/VA-104 (IC15)
   : (B)
   H MOD SAW : RV6/VA-104 (IC15)
   V MOD SAW : RV18/VA-104 (IC15)
   V EXT SAW : RV15/VA-104 (IC15)
   • Spec. : When the white shading occurs, adjust the RVs so that the waveform is flat.

(NOTE):
The V EXT SAW Adjustment is performed when the lens with an extender is used. Before adjustment, set the lense's EXT lever to the X2 position and adjust the iris control so that the output level at the VIDEO OUT terminal is 100 IRE. After adjustment is completed set the EXT level to the X1 position.

• Note

• After adjustment is completed, set S5 (WHITE CLIP & KEEP ON/OFF) on the PR-132A board to ON.

7-4-10. Black Set-Pedestal Adjustment

Step 1.

• NOTE

• This adjustment should be performed after the correction data of the microcomputer is erased.

• Setting

Equipment: Waveform Monitor	Board: VA-104 board

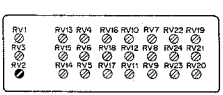
• Preparation

• To be extended; VA-104 board • Set the IRIS control to CLOSE. • S3 (Y/G SELECT)/EN-79P; G • Adjust the PEDESTAL control (on side panel) so that the pedestal level is approximately 10 IRE.

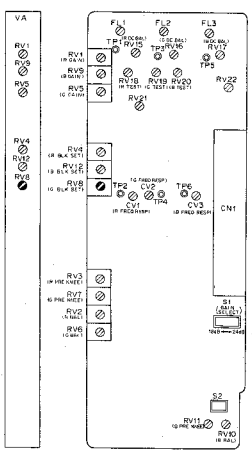
• Adjustment procedures

• Test point : Waveform Monitor (LUM mode)
• Adj. point : ✪ RV8 (G BLK SET)/VA-104
✪ RV2 (G +18dB BLK SET)
/VA-104, IC15
• Spec. : 1. Adjust so that the pedestal level does not fluctuate when the gain switch is set from 0 to 9 and vice versa.

2. Adjust so that the pedestal level does not fluctuate when the gain switch is set from 0 to 18 and vice versa.



H1C (IC15)
(COMPONENT SIDE) – On the VA-104 Board –



Step 2.

• Setting

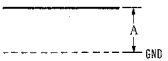
Equipment: Dualscope Oscilloscope (DC mode)	Board: PR-132A board

• Preparation

• To be extended; PR-132A board

• Adjustment procedures

• Test point : TP39/Extension board
• Adj. point : PEDESTAL control (side panel)
• Spec. : A = +2.3 ± 0.1 Vdc



Step 3.

• Setting

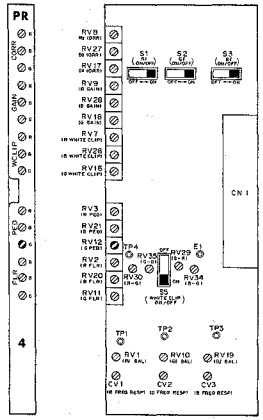
Equipment: Waveform Monitor	Board: PR-132A board

• Preparation

• GAIN selector (side panel): 0

• Adjustment procedures

• Test point : Waveform Monitor (LUM mode)
• Adj. point : ⊘ RV12 (G PED)/PR-132A
• Spec. : A = 20mV



PR-132A/U BOARD (PANEL SIDE)

PR-132A/U BOARD(COMPONENT SIDE)

Step 4

• Setting

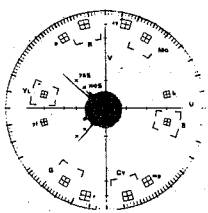
Equipment: Vectorscope	Board: PR-132A board

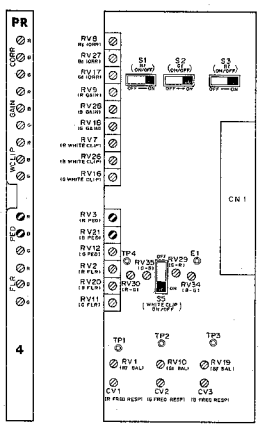
• Preparation

• S3 (Y/G SELECT)/EN-79P: ENC

• Adjustment procedures

• Test point : Vectorscope
• Adj. point : ⊘RV3 (R PED)/PR-132A
⊘RV21 (R PED)/PR-132A
• Spec. : Adjust so that the luminescent spot is in the center.





PR-132A/U BOARD (PANEL SIDE)

PR-132A/U BOARD(COMPONENT SIDE)

Step 5
• Setting

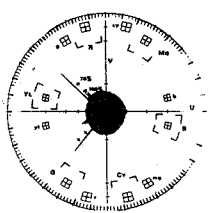
Equipment: Vectorscope	Board: VA-104 board

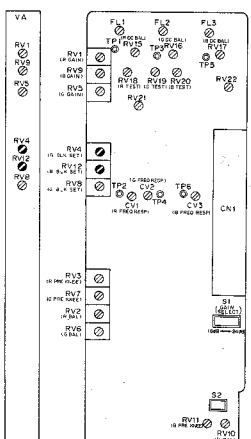
• Preparation

• To be extended: VA-104 board
• GAIN selector (side panel): 9

• Adjustment procedures

• Test point : Vectorscope
• Adj. point : ◪RV4 (R BLK SET)/VA-104
◪RV12 (B BLK SET)/VA-104
• Spec. : Adjust so that the luminescent spot is in the center.





Step 6

• Setting

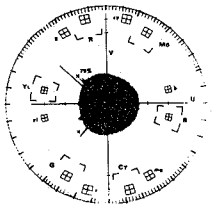
Equipment: Vectorscope	Board: VA-104 board

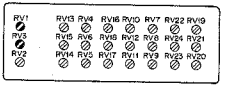
• Preparation

• GAIN selector (side panel): 18

• Adjustment procedures

• Test point : Vectorscope
• Adj. point : ⊘RV1 (R + 18dB BLK SET)/VA-104, IC15
⊘RV3 (R + 18dB BLK SET)/VA-104, IC15
• Spec. : Adjust so that the luminescent spot is in the center.





HIC (IC15)
(COMPONENT SIDE) – On the VA-104 Board –

Step 7
• Setting

Equipment: Vectorscope	Board: PR-132AU/VA-104 boards

• Preparation

• GAIN selector (side panel): 0 ↔ 9 ↔ 18

• Adjustment procedures

• Test point : Vectorscope
• Spec. : Adjust so that the luminescent spot is in the center.

1. Repeat the Steps 4 to 6.

7-4-11 Flare Adjustment

• Note

• This adjustment should be performed after the correction data of the microcomputer is erased.

• Setting

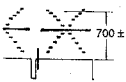
Equipment: Waveform Monitor	Board: PR-132A board

• Preparation

- To be extended; PR-132A board
- Cover the gray scale chart by the non-reflective cloth such as (velvet) which does not pass the light to be a reference of the black.
- S3 (Y/G SELECT)/EN-79P: ENC
- RV11 (G FLR)/PR-132A
  : Fully turn clockwise. (G FLR OFF)
- Shoot the gray scale chart in full underscan's picture frame of the monitor by zooming a lens.

• Adjustment procedures

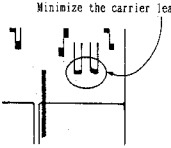
1. Test point : VIDEO OUT Terminal
   Adj. point : IRIS CONTROL
   Spec. : 700±10mV

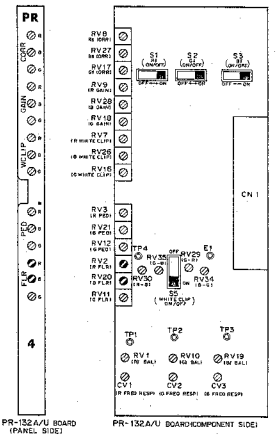


Open the iris control by one step from the above state. (1F stop OPEN)

2. Test point : Waveform Monitor
   Adj. point : ❶RV2 (R FLR)/PR-132A
   ❷RV20 (R FLR)/PR-132A
   Spec. :

Minimize the carrier leack.





• Note

• After adjustment is completed, check that the values of 7-4-10 Black Set • Pedestal Adjustment are not changed. When the values are changed, make this adjustment after readjusting the black set • Pedestal.

7-4-12 PR GAIN Adjustment

Step 1.

• Note

• This adjustment should be performed after the 7-4-6. Gamma Balance Adjustment is completed.

• Setting

Equipment: Dualtrace Oscilloscope	Board: PR-132A board

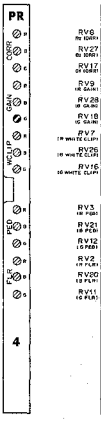
• Preparation

• To be extended; EN-79P board • S3 (TEST SAW)/SG-152AP: ON • Set the switches on the PR-132A baord as follows: S1 (Rγ): ON S2 (Gγ): ON S3 (Bγ): ON S5 (WHITE CLIP & KNEE ON/OFF): OFF

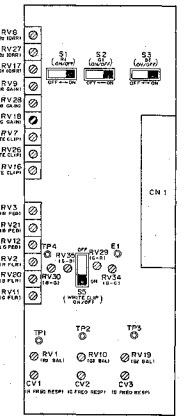
• Adjustment procedures

• Test point : TP2/EN-79P
GND TPE/EN-79P
• Adj. point : ❷RV18 (G GAIN)/PR-132A
• Spec. : A=0.7±0.02V

TRIG:HD(TP14/Extension board)



PR-132A/U BOARD (PANEL SIDE)



PR-132A/U BOARD (COMPONENT SIDE)

Step 2

• Note

• This adjustment should be performed after the 7-4-6. Gamma Balance Adjustment is completed.

• Setting

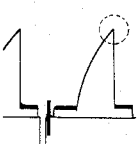
Equipment: Waveform Monitor	Board: PR-132A board

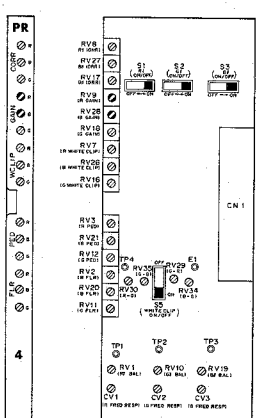
• Preparation

• Confirm that S3 (Y/G SELECT)/EN-79P is set to ENC.

• Adjustment procedures

• Test point : VIDEO OUT Terminal
• Adj. point : ●RV9 (R GAIN)/PR-132A
●RV28 (B GAIN)/PR-132A
• Spec. : Adjust using an waveform monitor so that the carrier leak of the peak level at the VIDEO OUT terminal is minimized.





PR-132A/U BOARD (PANEL SIDE)

PR-132A/U BOARD(COMPONENT SIDE)

• Note

• After adjustment is completed, set the switches as follows.
S3 (TEST SAW)/SG-152AP: OFF/S5 (WHITE CLIP & KNEE ON/OFF)
PR-132A: ON

7-4-13 EN Y Level Adjustment

• Setting

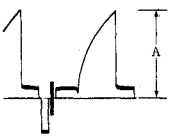
Equipment:Waveform Monitor	Board: EN-79P board

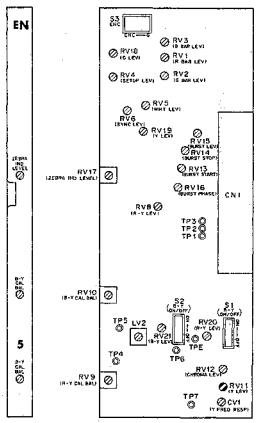
• Preparation

- S3 (Y/G SELECT)/EN-79P: ENC
- S3 (TEST SAW)/SG-152AP: ON
  S5 (WHITE CLIP & KNEE ON/OFF)/PR132A: OFF
- OUTPUT/DCC SW (side panel): CAM/OFF
- ⊘RV4 (SET UP LEV)/EN-79P → COUNTERCLOCKWISE

• Adjustment procedures

- Test point : VIDEO OUT Terminal
- Adj. point : ⊘RV11(Y LEV)/EN-79P
- Spec. : Adjust so that thelevel A of the test waveform at the VIDEO OUT terminal is 700±10mV.





• Note

- After adjustment is completed, set the switches as follows:
  OUTPUT/DCC (side panel): CAM/OFF
  S3 (TEST SAW)/SG-152AP: OFF
  S5 (WHITE CLIP & KNEE ON/OFF)/PR-132A: ON

7-4-14 G Level Adjustment

• Setting

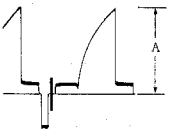
Equipment:Waveform Monitor	Board: EN-79P board

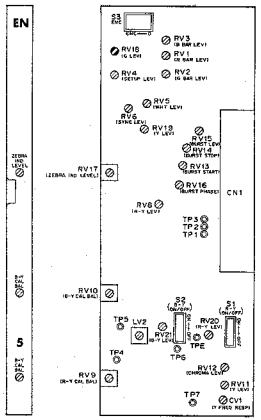
• Preparation

- To be extended: EN-79P board
- S3 (Y/G SELECT)/EN-79P: G
- S3 (TEST SAW)/SG-152AP: ON
- S5 (WHITE CLIP & KNEE ON/OFF)/PR132A: OFF

• Adjustment procedures

- Test point : Waveform Monitor
- Adj. point : RV18(G LEV)/EN-79P
- Spec. : Adjust so that the level A of the test waveform at the VIDEO OUT terminal is 700±10mV.





• Note

- After adjustment is completed, set the switches as follows:
  S3 (TEST SAW)/SG-152AP: OFF
  S5 (WHITE CLIP & KNEE ON/OFF)/PR-132A: ON
  S3 (Y/G SELECT)/EN-79P: ENC

7-4-15 Gamma Correction Adjustment

Step 1

• Note

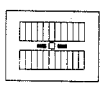
• This adjustment should be performed after the 7-4-12. PR Gain Adjustment is completed.

• Setting

Equipment: Waveform Monitor	Board: PR-132A board

• Preparation

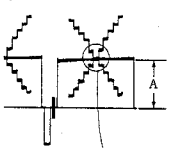
- To be extended; PR-132A board
- S3 (Y/G SELECT)/EN-79P: G
- Set the switches on the PR-132A baord as follows:
  - S1 (Ry): ON
  - S2 (Gy): ON
  - S3 (By): ON
  - S5 (WHITE CLIP & KNEE ON/OFF): OFF
- Shoot the gray scale chart in full underscan's picture frame of the monitor by zooming a lens.



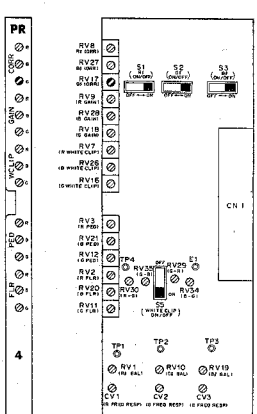
• Adjustment procedures

1. • Test point : VIDEO OUT Terminal
   • Adj. point : iris control
   • Spec. : 700±10mV (WHITE LEVEL)

2. • Test point : VIDEO OUT Terminal
   • Adj. point : ✽RV17 (GγCORR)/PR-132A
   • Spec. : 420±20mV



The level A at the cross point should be 420 ± 20mV



Step 2

• Setting

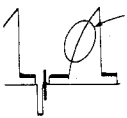
Equipment: Waveform Monitor	Board: PR-132A board

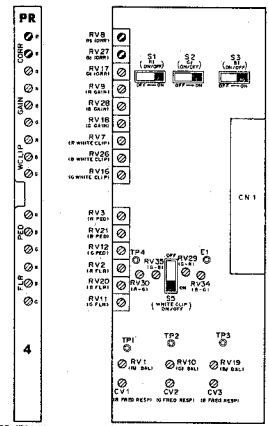
• Preparation

• S3 (Y/G SELECT)/EN-79P: ENC
• S3 (TEST SAW)/SG-152AP: ON

• Adjustment procedures

• Test point : VIDEO OUT Terminal
• Adj. point : ❷RV8(Ry CORR)/PR-132A
❷RV27(By CORR)/PR-132A
• Spec. : Minimize the carrier leak.





• Note

• After adjustment is completed, check that the specification in the 7-4-10 Black Set • Pedestal Adjustment is satisfied.
• After adjustment is completed, set the switches as follows.
S3 (TEST SAW)/SG-152AP: OFF
S5 (WHITE CLIP & KNEE ON/OFF)/PR-132A: ON

7-4-16 Knee White Clip Adjustment

Step 1

• Note

• This adjustment should be performed after the 7-4-4. Pre knee Adjustment is completed.

• Setting

Equipment: Waveform Monitor	Board: PR-132A board

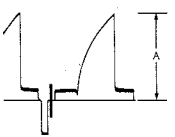
• Preparation

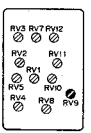
• To be extended; PR-132A board • GAIN selector (side panel): 0 • OUTPUT/DCC sw (side panel): CAM/OFF • S5 (WHITE CLIP & KNEE ON/OFF)/PR-132A: ON • S3 (Y/G SELECT)/EN-79P: G • S3 (TEST SAW)/SG-152AP: ON	• Fully turn the RVs on the PR-132A board clockwise. RV16 (G WHITE CLIP) RV17 (R WHITE CLIP) RV26 (B WHITE CLIP) • Fully turn the RVs on the PR-132A board (IC-3 (BH-1265)) clockwise. RV7 (G SLOPE) RV3 (R SLOPE) RV12 (B SLOPE) Set RV1 (R TRACK) and RV10 (B TRACK) to the mechanical center.

• Adjustment procedures

• Manual knee white clip adjustment
• Test point : VIDEO OUT Terminal
• Adj. point : ❷RV9 (MANU KNEE)/PR-132A/IC3 (BH-1265)
• Specl. : Adjust the peak level at the VIDEO OUT terminal sing a waveform monitor.

White clip level / Measurement point	750 mV	735 mV	720 mV
A(manual knee point)	690 mV	670 mV	670 mV





HIC (IC3)
(COMPONENT SIDE)
–On the PR-132A/U Board–

Step 2

• Setting

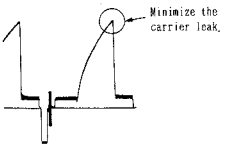
Equipment: Waveform Monitor	Board: PR-132A board

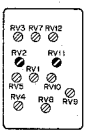
• Preparation

• S3 (Y/G SELECT)/EN-79P : ENC

• Adjustment procedures

• Test point : VIDEO OUT Terminal
• Adj. point : ❶RV2 (R KNEE)/PR-132A/IC3 (BH-1265)
❶RV11 (R KNEE)/PR-132A/IC3 (BH-1265)
• Spec. : Adjust so that the carrier leak of the peak level at the VIDEO OUT terminal is minimized.





HIC (IC3)
(COMPONENT SIDE)
–On the PR-132A/U Board–

Step 3
• Setting

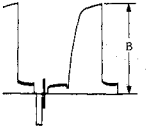
Equipment: Waveform Monitor	Board: PR-132A board

• Preparation

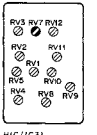
• GAIN selector (sode panel): 9
• S3 (Y/G SELECT)/EN-79P: G

• Adjustment procedures

• Test point : VIDEO OUT Terminal
• Adj. point : ●RV7 (G SLOPE)/PR-132A/IC3 (BH-1265)
• Spec. : Adjust the peak level at the VIDEO OUT terminal.



White clip level / Measurement point	750 mV	735 mV	720 mV
B (knee slope)	770 mV	750 mV	750 mV



H(C7)C3)
(COMPONENT SIDE)
–On the PR-132A/U Board–

Step 4

• Setting

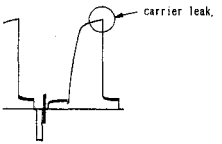
Equipment: Waveform Monitor	Board: PR-132A board

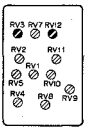
• Preparation

- S3 (Y/G SELECT)/EN-79P: ENC

• Adjustment procedures

- Test point : VIDEO OUT Terminal
- Adj. point : ●RV3 (R SLOPE)/PR-132A/IC3 (BH-1265)
  ●RV12 (B SLOPE)/PR-132A/IC3 (BH-1265)
- Spec. : Minimize the carrier leak.





H/C (IC3)
(COMPONENT SIDE)
–On the PR-132A/U Board–

Step 5

• Setting

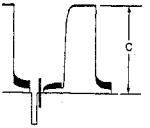
Equipment: Waveform Monitor	Board: PR-132A board

• Preparation

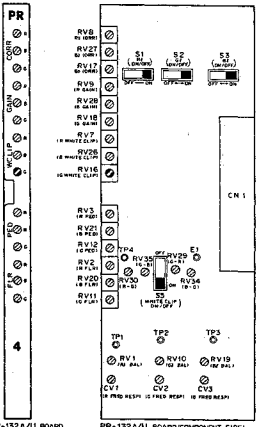
• S3 (Y/G SELECT)/EN-79P: G
• GAIN selector (side panel): 18

• Adjustment procedures

• Test point : VIDEO OUT Terminal
• Adj. point : ✿RV16 (G WHITE CLIP)/PR-132A
• Spec. : Adjust the white clip level at the VIDEO OUT terminal.



White clip level / Measurement point	750 mV	735 mV	720 mV
C(white clip)	750 mV	735 mV	720 mV



Step 6

• Setting

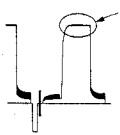
Equipment: Waveform Monitor	Board: PR-132A board

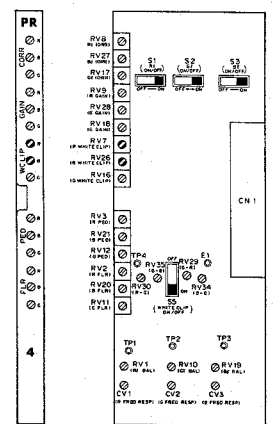
• Preparation

• S3 (Y/G SELECT)/EN-79P: ENC

• Adjustment procedures

• Test point : VIDEO OUT Terminal
• Adj. point : ●RV7 (R WHITE CLIP)/PR-132A
●RV26 (R WHITE CLIP)/PR-132A
• Spec. : Minimize the carrier leak.





Step 7

• Setting

Equipment: Dualtrace Oscilloscope	Board: PR-132A board

• Preparation

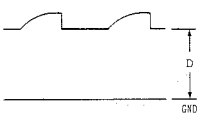
• GAIN selector (sode panel): 18
• OUTPUT/DCC sw (side panel): CAM/OFF

• Adjustment procedures

Auto knee adjustment

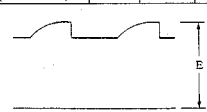
1.• Test point : TP4 (DCC SET)/PR-132A
GND: E1/PR-132A
• Adj. point : ❷RV8 (AUTO START)/PR-132A/IC3 (BH-1265)
• Spec. :

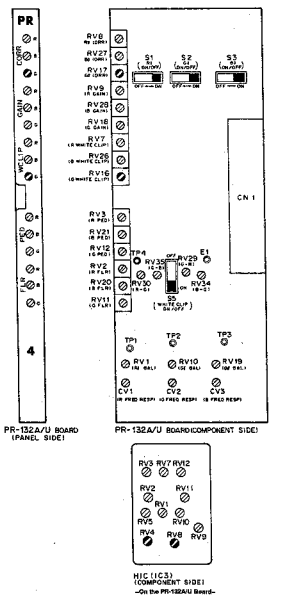
Measurement point \ White clip level	750mV	735mV	720mV
D (DC at TP4)	1.6Vdc	1.5Vdc	1.4Vdc



2.• Test point : TP4 (DCC SET)/PR-132A
GND: E1/PR-132A
• Adj. point : ❷RV4 (AUTO LIMIT)/PR-132A/IC3 (BH-1265)

Measurement point \ White clip level	750mV	735mV	720mV
E (Peak at TP4)	1.9Vdc	1.8Vdc	1.7Vdc





Step 8

• Setting

Equipment: Waveform Monitor	Board: PR-132A board

• Preparation

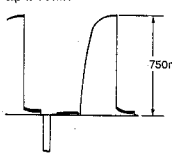
- GAIN selector (sode panel): 18
- OUTPUT/DCC sw (side panel): CAM/ON
- S3 (Y/G SELECT)/EN-79P: G
- GAIN selector (sode panel): 0

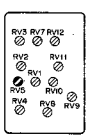
• Adjustment procedures

Auto knee gain adjustment

- Test point : VIDEO OUT Terminal
- Adj. point : ●RV5 (AUTO GAIN)/PR-132A/IC3 (BH-1265)
- Spec. :

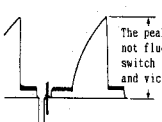
For white clip is 750mV





IC3 (IC3)
(COMPONENT SIDE)
–On the PR-132A/U Board–

For white clip is 735mV or 720mV
DCC-ON ⟷ OFF



Step 9
• Setting

Equipment:Wafeform Monitor	Board: PR-132A board

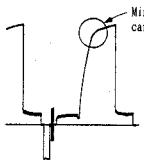
• Preparation

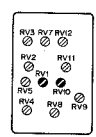
• GAIN selector (side panel): 18
• OUTPUT/DCC sw: CAM/ON
• S3 (Y/G SELECT)/EN-79P: ENC

• Adjustment procedures

• Test point : VIDEO OUT Terminal
• Adj. point : ❷RV1 (R-TRACK)/PR-132A/IC3 (BH-1265)
❷RV10 (B-TRACK)/PR-132A/IC3 (BH-1265)
• Spec. :

For knee carrier leak is appeared too much





H1C (IC3)
(COMPONENT SIDE)
–On the PR-132A/J Board–

• Note

• After adjustment is completed, set the switches as follows.
GAIN selector (side panel): 0
OUTPUT/DCC sw (side panel): CAM/OFF
S3 (TEST SAW)/SG-152AP: OFF

7-4-17. Color Bars Adjustment

Step 1

• Note

• This adjustment should be performed after the 7-4-13. EN Y Level Adjustment is completed.

• Setting

Equipment: Waveform Monitor	Board: EN-79P board

• Preparation

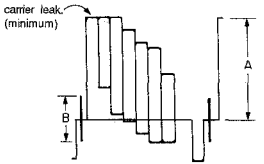
• To be extended; EN-79P board • OUTPUT/DCC sw (side panel): BARS /OFF • S3 (Y/G SELECT) / EN-79P: ENC

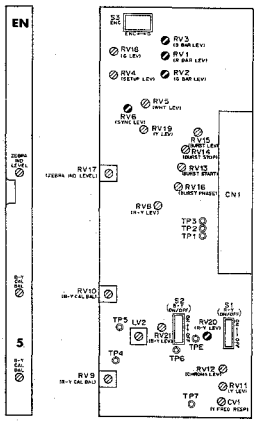
• Adjustment procedures

• Test point : VIDEO OUT Terminal
• Adj. point : • White level
- RV2 (G BAR LEV)/EN-79P
- RV1 (R BAR LEV)/EN-79P
- RV3 (B BAR LEV)/EN-79P

• Sync level
- RV6 (SYNC LEV)/EN-79P

• Spec. : White level
A = 700 ± 10mV
Sync level
B = 300 ± 10mV





EN-79/U/P BOARD (PANEL SIDE)

EN-79/U/P BOARD (COMPONENT SIDE)

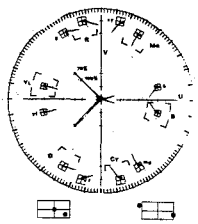
Step 2.

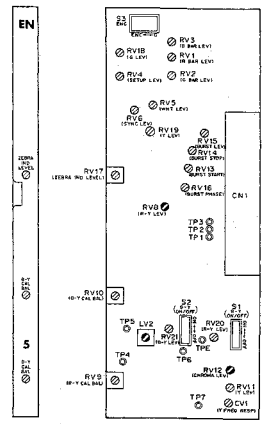
• Setting

Equipment: Vectorscope	Board: EN-79P board

• Adjustment procedures

• Test point : Vectorscope
• Adj. point : RV9 (R-Y LEV)/EN-79P
RV12 (CHROMA LEV)/EN-79P
LV2 (SC QUAD)/EN-79P
• Spec. : Set the luminescent spot in mark ⊞ on the vectorscope.





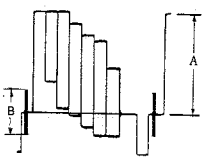
Step 3.

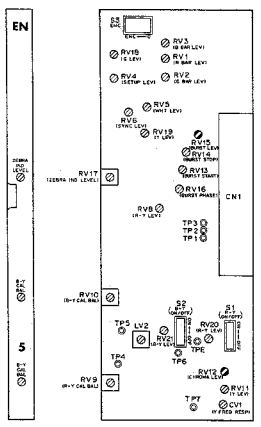
• Setting

Equipment: Waveform Monitor	Board: EN-79P board

• Adjustment procedures

• Test point : VIDEO OUT Terminal
• Adj. point : ⊘ RV12 (CHROMA LEV) /EN-79P
⊘ RV15 (BURST LEV) /EN-79P
• Spec. : Adjust so that the yellow peak level A is 700 ± 10mV and the burst level B is 300 ± 10mV





EN-79/U/P BOARD (PANEL SIDE)

EN-79/U/P BOARD (COMPONENT SIDE)

• Note

- After adjustment is completed, the luminescent spot on the setup 0's vectorscope is located in mark ⊞.
  For vectorscopes other than the above, the spot is not located in mark ⊞.
- After adjustment is completed, set the OUTPUT/DCC switch (side panel) to CAM/OFF.

7-4-18. VTR Y Adjustment

• Setting

Equipment: Dualtrace Oscilloscope	Board: EN-79P board

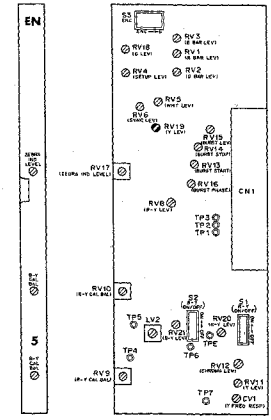
• Preparation

- To be extended; EN-79P board
- OUTPUT/DCC SW: BARS/OFF

• Adjustment procedures

- Test point : TP5 (GND: TP6)
  /Extension board
- Adj. point : RV19 (VTR Y LEV)
  /EN-79P
- Spec. : A = 1.0 ± 0.01V

TRIG: HD (TP14/Extension board)



EN-79/I/P BOARD (PANEL SIDE)

EN-79/I/P BOARD (COMPONENT SIDE)

• Note

- After adjustment is completed, set the OUTPUT/DCC switch to CAM/OFF.

7-4-19. VTR R-Y Adjustment

• Setting

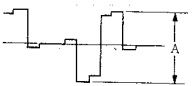
Equipment: Dualtrace Oscilloscope	Board: EN-79P board

• Preparation

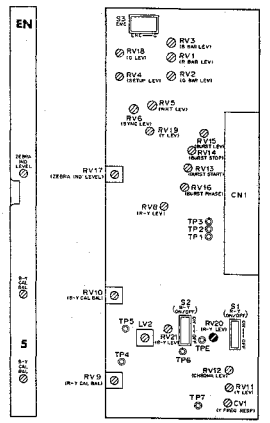
• To be extended; EN-79P board
• OUTPUT/DCC sw: BARS/OFF

• Adjustment procedures

• Test point : TP7(GND: TP8)
/Extension board
• Adj. point : ⊘ RV20(R-Y LEV)/EN-79P
• Spec. : A = 525 ± 5mV



TRIG: HD (TP14/Extension board)



EN-79/U/P BOARD (PANEL SIDE)

EN-79/U/P BOARD (COMPONENT SIDE)

• Note

• After adjustment is completed, set the OUTPUT/DCC switch to CAM/OFF.

7-4-20. VTR B–Y Adjustment

• Setting

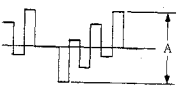
Equipment: Dualtrace Oscilloscope	Board: EN-79P board

• Preparation

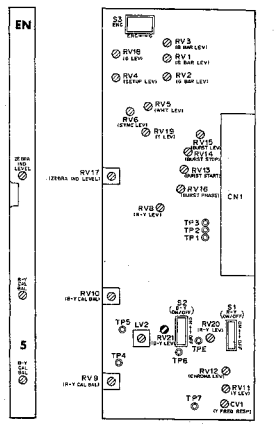
• To be extended; EN-79P board
• OUTPUT/DCC sw: BARS/OFF

• Adjustment procedures

• Test point : TP9 (GND: TP10)
/Extension board
• Adj. point : ⊘ RV21 (B–Y LEVEL)
/EN-79P
• Spec. : A = 525 ± 5mV



TRIG: HD (TP14/Extension board)



• Note

• After adjustment is completed, set the OUTPUT/DCC switch to CAM/OFF.

7-4-21. Zebra Level Adjustment

• Setting

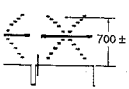
Equipment: Waveform Monitor	Board: EN-79P board

• Preparation

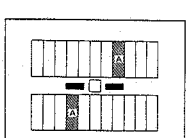
- To be extended; EN-79P board
- S3 (Y/G SELECT) / EN-79P: ENC
- S5 (WHITE CLIP & KNEE ON/OFF) / PR-132A: OFF
- ZEBRA sw (viewfinder): ON
- Shoot the gray scale chart in full underscan's picture frame by zooming a lens.

• Adjustment procedures

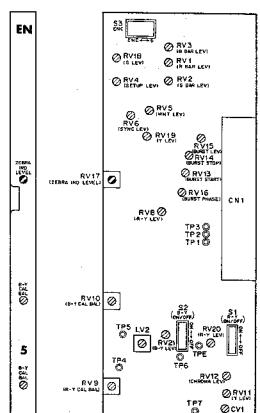
1. • Test point : VIDEO OUT Terminal
   • Adj. point : IRIS control
   • Spec. : 700 ± 10mV



2. • Test point : VIEWFINDER
   • Adj. point : ⊘ RV17/EN-79 (ZEBRA IND LEVEL)
   • Spec. : Adjust so that a striped pattern appears at portions A.



(Viewfinder screen)



7-5. DETAIL SIGNAL SYSTEM ADJUSTMENT

7-5-1. White Clip Adjustment

• Setting

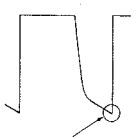
Equipment: Dualtrace Oscilloscope	Board: IE-30P board

• Preparation

- To be extended; IE-30P board
- S3 (Y/G SELECT) / EN-79P: ENC
- S1 (DTL)/IE-30P: ON • S3 (TEST SAW)/SG-152AP: ON
- GAIN selector (side panel): 18

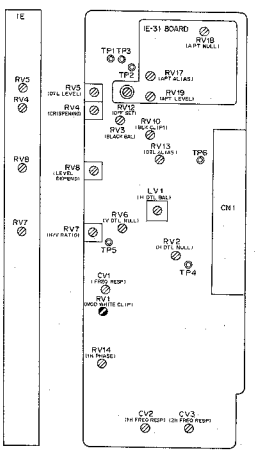
• Adjustment procedures

- Test point : TP45/Extension board
- Adj. point : RV1 (MOD WHITE CLIP) /IE-30P
- Spec. :



Adjust so that the peak value of the test waveform reaches just before the clipping point.

TRIG: HD (TP16/Extension board)



• Note

- After adjustment is completed, set the GAIN selector (side panel) to 0.

7-5-2. V DTL Null Adjustment

• Setting

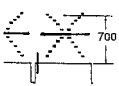
Equipment: Dualtrace Oscilloscope	Board: IE-30P board

• Preparation

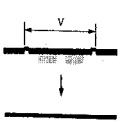
- To be extended; IE-30P board
- S3 (Y/G SELECT) / EN-79P: ENC
- S1 (DTL) / IE-30P: ON
- Shoot the gray scale chart in full underscan's picture frame of the monitor by zooming a lens.

• Adjustment procedures

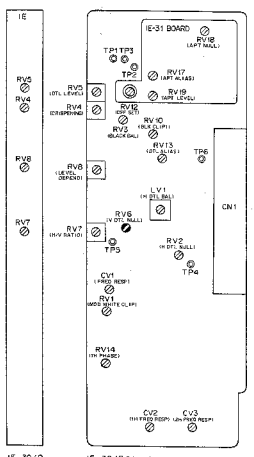
1. • Test point : VIDEO OUT Terminal
   • Adj. point : IRIS control
   • Spec. : 700 ± 10mV (WHITE LEVEL)



2. • Test point : TP5/IE-30P
   • Adj. point : ✪ RV6/ (VDTL NULL)/IE-30
   • Spec. :



TRIG: VD (TP17/Extension board)



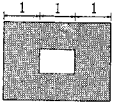
7-5-3. H DTL Null Adjustment

• Setting

Equipment: Dualtrace Oscilloscope	Board: IE-30P board

• Preparation

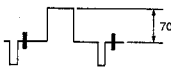
- To be extended; IE-30P board
- S3 (Y/G SELECT) / EN-79P: ENC
- S1 (DTL)/IE-30P: ON
- Shoot the white window chart using a zoom lens as illustrated below.



(Monitor)

• Adjustment procedures

1. • Test point : VIDEO OUT Terminal
   • Adj. point : IRIS CONTROL
   • Spec. : 700 ± 10mV (WHITE LEVEL)

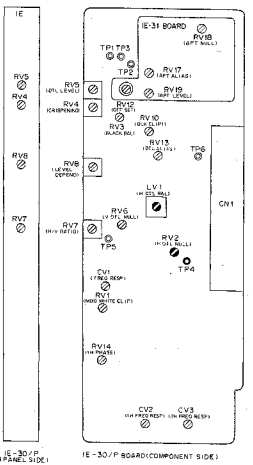


2. • Test point : TP4/IE-30P
   • Adj. point : ⊘ RV2 (H DTL NULL) /IE-30P

Make flat.
TRIG: HD (TP16/Extension board)

3. • RV5 (DTL LEVEL)/IE-30P: Fully turn clockwise
4. • Test point : TP4/IE-30P
   • Adj. point : ⊘ LV1 (H DTL BAL) /IE-30P
   • Spec. : A = B

A = B
TRIG: HD (TP16/Extension board)



• Note

- After adjustment is completed, perform the 7-5-4 Black Balance Adjustment.

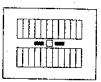
7-5-4. Black Balance Adjustment

• Setting

Equipment: Dualtrace Oscilloscope	Board: IE-30P board

• Preparation

- To be extended; IE-30P board
- S3 (Y/G SELECT) / EN-79P: ENC
- S1 (DTL)/IE-30P: ON
- Turn RVs on the IE-30 board as follows:
  - RV4 (CRISPENING) : Fully clockwise
  - RV5 (DTL LEVEL) : Fully clockwise
  - RV8 (LEVEL DEPEND) : Fully counterclockwise
  - RV7 (H/V RATIO) : mechanical center
- Shoot the gray scale chart in full underscan's picture frame by zooming a lens.

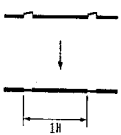


(Monitor)

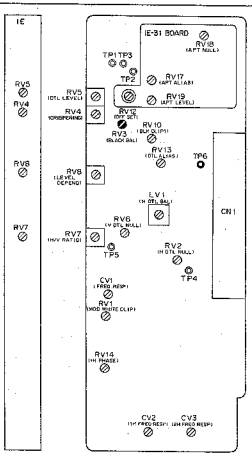
• Adjustment procedures

1. • Test point : VIDEO OUT Terminal
   • Adj. point : IRIS CONTROL
   • Spec. : 700 ± 10mV (WHITE LEVEL)

2. • Test point : TP6/IE-30P
   • Adj. point : ⊘ RV3 (BLACK BAL) /IE-30P
   • Spec. :



Make flat.
TRIG: HD (TP16/Extension board)



• Note

- After adjustment is completed, perform the 7-5-10 Level Dependent Adjustment.

7-5-5. Aperture Null Adjustment

• Setting

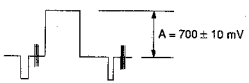
Equipment: Dualtrace Oscilloscope	Board: IE-30P board

• Preparation

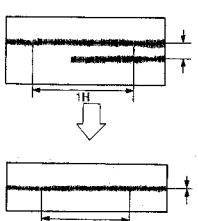
- To be extended; IE-30P board
- S1 (DTL) / IE-30P : OFF
- S2 (APERTURE) / IE-30P : ON
- Shoot the white window chart using a zoom lens as illustrated below.

• Adjustment procedures

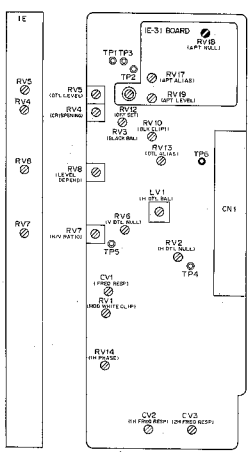
1. • Test point : VIDEO OUT Terminal
   • Adj. point : IRIS CONTROL
   • Spec. : A = 700 ± 10 mV



2. • Test point : TP6
   • Adj. point : ✪ RV18 / IE-31
   • Spec. : Obtain a flat waveform



TRIG:HD (TP16/Extension board)



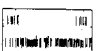
7-5-6. Resolution Adjustment

• Setting

Equipment: Waveform Monitor	Board: VA-104 board

• Preparation

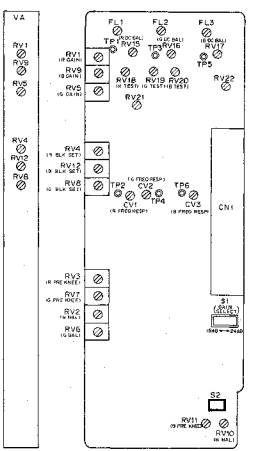
- Shoot the multi-burst chart in full underscan's picture frame by zooming a lens.
- S1 (DTL ON/OFF)/IE–30P:OFF
- S2 (APERTURE)/IE-30P:OFF
- Pan so that the 8, 9 MHz of the multi-burst chart is positioned at center on the monitor screen.



(Monitor)

1. • Test point : VIDEO OUT Terminal
   • Adj. point : IRIS CONTROL
   • Spec. : 700 ± 10mV

2. • Test point : Monitor
   • Adj. point : S2 (SHD π PHASE) /VA-104
   • Spec. : 1. Slightly pan the camera so that the resolution is optimum.
   2. Adjust so that the resolution is maximized.
   3. Repeat Steps 1 and 2 so that the resolution is more than 700 TV lines.



7-5-7. Aperture Alias Adjustment

• Setting

Equipment: Waveform monitor	Board: IE-30P board

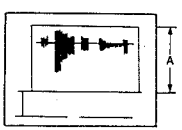
• Preparation

- To be extended; IE-30P board
- S1 (DTL ON/OFF) / IE-30P : OFF
- S2 (APERTURE) / IE-30P : ON
- Shoot the multi-burst chart using a zoom lens.
- Pan so that the 8, 9 MHz of the multi-burst chart is positioned at center on the monitor screen.

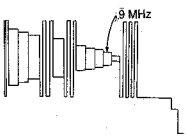
(Monitor)

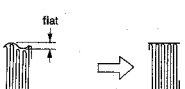
• Adjustment procedures

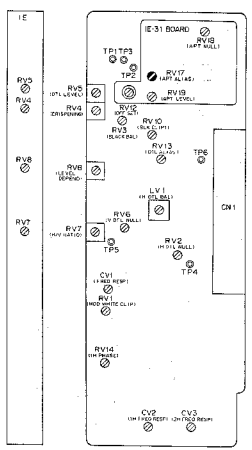
1. • Test point : VIDEO OUT Terminal
   • Adj. point : IRIS CONTROL
   • Spec. : A = 640 ± 10 mV



2. • Test point : VIDEO OUT Terminal
   • Adj. point : ✪ RV17 / IE-31
   • Spec. : Adjust so that the 9 MHz signal of multi-burst chart becomes horizontally flat.







7-5-8. DTL Alias Adjustment

• Setting

Equipment: Waveform monitor	Board: IE-30P board

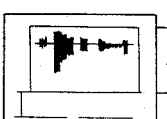
• Preparation

- To be extended; IE-30P board
- S1 (DTL ON/OFF) switch/ IE-30P board : ON
- S2 (APERTURE) switch/ IE-31 board : OFF
- ENC/RGB switch (side panel) ⟶ ENC
- ⊘ RV5 (DTL)/IE-30P board ⟶ fully clockwise
- ⊘ RV7 (H/V RATIO)/IE-30P board ⟶ fully clockwise
- Lens Zoom : Underscanned picture frame on the monitor = chart frame
- Pan so that the 9 MHz of the multi-burst chart is positioned at center on the monitor screen.

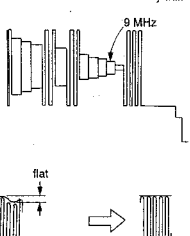
(Monitor)

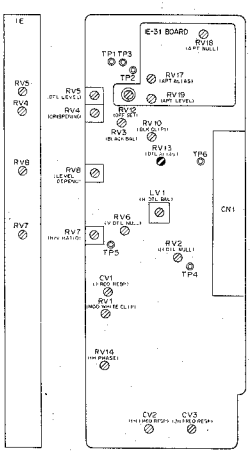
• Adjustment procedures

1. • Test point : VIDEO OUT Terminal
   • Adj. point : ⊘ RV13/IE-30P
   • Spec. : A = 700 ± 10 mV



2. • Test point : VIDEO OUT Terminal
   • Adj. point : ⊘ RV13 / IE-30P
   • Spec. : Adjust so that the 9 MHz Signal of multi-burst chart becomes horizontally flat.





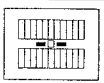
7-5-9. Crispening adjustment

• Setting

Equipment: Waveform monitor	Board: IE-30P board

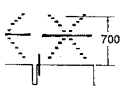
• Preparation

- To be extended; IE-30P board
- S1 (DTL ON/OFF) switch/ IE-30P board : ON
- ✪ RV8 (LEV DEP)/IE-30P board ⟶ fully conterclockwise
- ✪ RV7 (H/V/RATIO)/IE-30P board ⟶ fully counterclockwise
- Shoot the gray scal chart in full underscan's picture frame by zooming a lens.

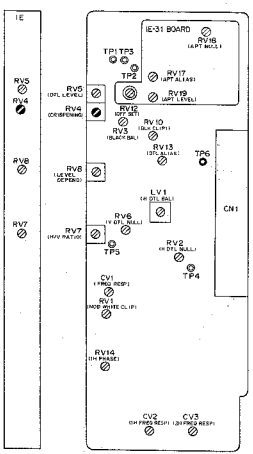

(Monitor)

• Adjustment procedures

1. • Test point : VIDEO OUT Terminal
   • Adj. point : ✪ RV4/IE-30P board
   • Spec. : 700 ± 10 mV (WHITE LEVEL)



2. • Test point : VIDEO OUT Terminal
   • Adj. point : ✪ RV4 (CLISP)/ IE-30P board
   • Spec. : Noise of the output waveform on the waveform monitor start to be reduced.



7-5-10. Level Dependent Adjustment

• Setting

Equipment: Waveform Monitor	Board: IE-30P board

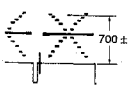
• Preparation

• To be extended; IE-30P board
• S3 (Y/G SELECT) / EN-79P: G
• S1 (DTL)/IE-30P: ON
• Shoot the gray scale chart in full underscan's picture frame by zooming a lens.

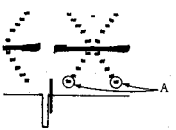
(Monitor)

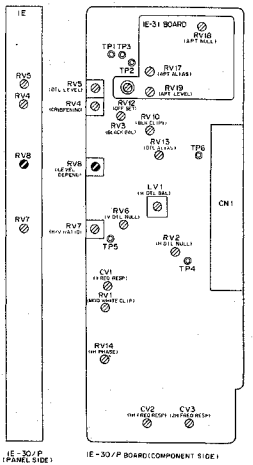
• Adjustment procedures

1. • Test point : VIDEO OUT Terminal
   • Adj. point : IRIS CONTROL
   • Spec. : 700 ± 10mV (WHITE LEVEL)



2. • Test point : Waveform Monitor
   • Adj. point : ⊘ RV8 (LEVEL DEPEND) /IE-30P
   • Spec. : The detail signal should not be added to portion A.





• Note

• After adjustment is completed, perform the 7-5-12 H/V RATIO, Detail Level Adjustment.

7-5-11. Aperture Adjustment

• Setting

Equipment: Waveform monitor	Board: IE-30P board

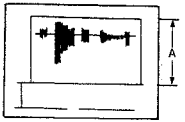
• Preparation

- To be extended; IE-30P board
- S1 (DTL ON/OFF) / IE-30P : OFF
- S2 (APERTURE) / IE-30P : ON
- Shoot the multi-burst chart using a zoom lens.

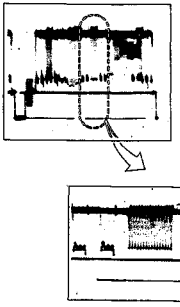
(Monitor)

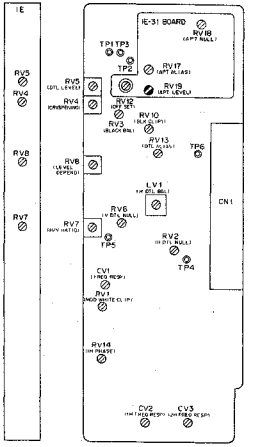
• Adjustment procedures

1. • Test point : VIDEO OUT Terminal
   • Adj. point : IRIS CONTROL
   • Spec. : A = 640 ± 10 mV



2. • Test point : VIDEO OUT Terminal
   • Adj. point : ⊘ RV19 / IE-31P
   • Spec. : B = 0





7-5-12. H/V Ratio, Detail Level Adjustment

• Setting

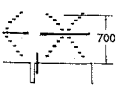
Equipment: Waveform Monitor	Board: IE-30P board

• Preparation

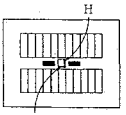
- To be extended; IE-30P board
- S3 (Y/G SELECT) / EN-79P: ENC
- S1 (DTL)/IE-30P: ON
- RV5 (DTL LEVEL)/IE-30P: Fully turn clockwise.
- Shoot the gray scale chart in full underscan's picture frame by zooming a lens.

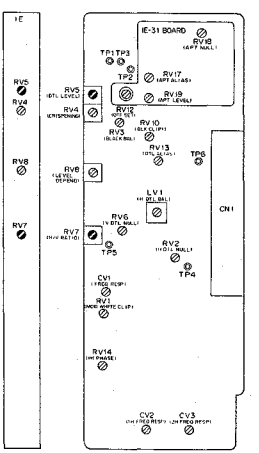
• Adjustment procedures

1. • Test point : VIDEO OUT Terminal
   • Adj. point : IRIS CONTROL
   • Spec. : 700 ± 10mV (WHITE LEVEL)



2. • Test point : Monitor
   • Adj. point : ● RV7 (H/V RATIO) /IE-30P
   ● RV5 (DTL LEVEL) /IE-30P
   • Spec. : The ratio of the detail signals which are added in the horizontal and vertical directions should be the same.
   Set the detail level according to the user's requist by adjusting.





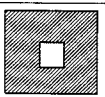
7-5-13. Streaking Adjustment

• Setting

Equipment:	Board: PA-120 board

• Preparation

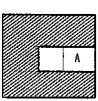
• Shoot the white window chart using a zoom lens.
• Set the iris control to F5.6-4.
• GAIN selector (side panel): 18



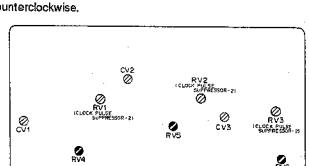
(Monitor)

• Adjustment procedures

• Test point : Color Monitor
• Adj. point : ⊘ RV4 (R STREAKING)/PA-120
⊘ RV5 (B STREAKING)/PA-120
⊘ RV6 (G STREAKING)/PA-120
• Spec. : Streaking atportion A should be decrease.



(NOTE) Not fix the RV4, 5 and 6 at the fully counterclockwise.



PA-120 BOARD (SOLDERING SIDE)

7-6. AUTO CONTROL SYSTEM ADJUSTMENT

7-6-1. Auto Iris Adjustmen t

• Setting

Equipment: Waveform Monitor	Board: SG-152AP board

• Preparation

• Iris AUTO/MANU (lens) sw: AUTO
• OUTPUT/DCC sw (side panel): CAM/ON
• Shoot the gray scale chart in full underscan's picture frame by zooming a lens.

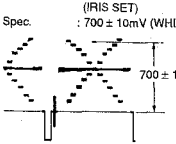
(Monitor)

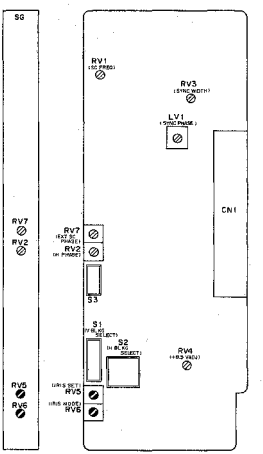
• Adjustment procedures

1. • Test point : VIDEO OUT Terminal
   • Adj. point : ✪ RV6/SG-152AP (IRIS MODE)
   • Spec. : Using RV6 (IRIS MODE) on the SG-152AP board, the auto iris mode can be set between the video signal's mean value-based operation (fully turned clockwise) and peak value-based operation (fully turned counterclock-wise).
   The mode can be set as required.
   RV6 is usually set to the center position.

RV6
(IRIS MODE)

2. • Test point : VIDEO OUT Terminal
   • Adj. point : ✪ RV5/SG-152AP (IRIS SET)
   • Spec. : 700 ± 10mV (WHITE LEVEL)





• Note

• After adjustment is completed, set the iris (AUTO/MANU) (lens) switch to MANU.

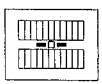
7-6-2. Low Video Adjustment

• Setting

Equipment: Waveform Monitor	Board: AT-49A board

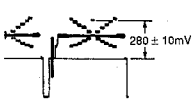
• Preparation

• S3 (Y/G SELECT)/ EN-79P: ENC
• Shoot the gray scale chart in full underscan's picture frame by zooming a lens.

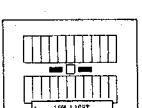

(Monitor)

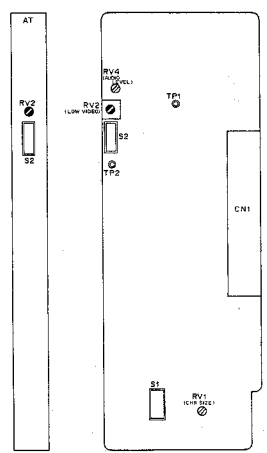
• Adjustment procedures

1. • Test point : VIDEO OUT Terminal
   • Adj. point : IRIS CONTROL
   • Spec. : 280 ± 10mV (White level)



2. • Test point : Viewfinder
   • Adj. point : ⊘ RV2/AT-49A (LOW VIDEO)
   • Spec. : Turn ⊘ RV2 (LOW VIDEO) on the AT-49A board from fully counterclockwise to clockwise so that "LOW LIGHT" appears on the viewfinder.





7-6-3. Character Size Adjustment

• Setting

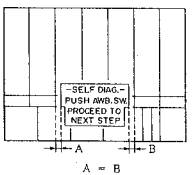
Equipment:	Board: AT-49A board

• Preparation

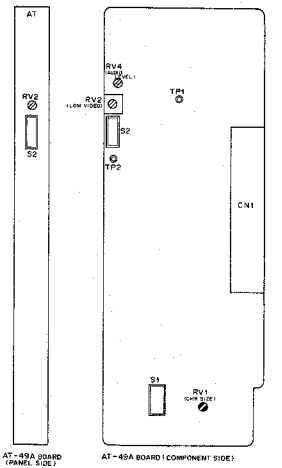
- OUTPUT/DCC sw (side panel): BARS/OFF
- S3 (Y/G SELECT) / SG-152AP: ENC
- S1-2 (CHECK) / AT-49A: ON

• Adjustment procedures

- Test point : Viewfinder
- Adj. point : ⊘ RV1 (CHR SIZE)/AT-49A
- Spec. : Adjust so that the characters on the viewfinder are displayed in the center.



A = B



• Note

- After adjustment is completed, set the switches as follows.
  OUTPUT/DCC sw (side panel): CAM/OFF
  S1-2 (CHECK)/AT-49A : OFF

7-6-4. Audio Level Adjustment

• Setting

Equipment: Dualtrace Oscilloscope	Board: AT-49A board

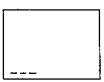
• Preparation

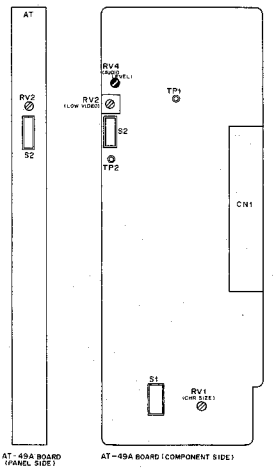
- To be extended; AT-49A board
- Set the AUDIO IN switch of the viewfinder to ON.
- Supply a 1kHz sine wave signal (0 dBu) to the AUDIO IN CH-1 terminal.
- AUDIO SELECT CH-1 sw (side panel): MAN
- AUDIO IN sw (side panel): LINE

• Adjustment procedures

1. • Test point : TP13/Extension board
   • Adj. point : ✪ AUDIO LEVEL CH-1 control (side panel)
   • Spec. : 0.7 Vp-p

2. • Test point : Viewfinder
   • Adj. point : ✪ RV4 (AUDIO LEVEL) /AT-49A
   • SPEC. : Gradually turn ✪ RV4 (AUDIO LEVEL) on the AT-49A board from fully clockwise to counterclockwise so that the third "–" (from the left) appears on the viewfinder.





• Note

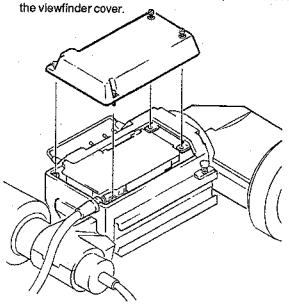
- After adjustment is completed, insert the AT-49A board.

7-7. VIEWFINDER SYSTEM ADJUSTMENT

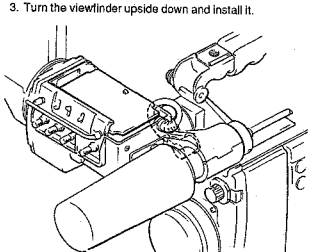
This adjustment should be performed after the camera is adjusted completely.

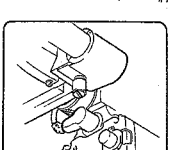
1. Turn OFF The main POWER switch (side panel) before adjustment.

2. Remove the viewfinder from the camera, then remove the viewfinder cover.

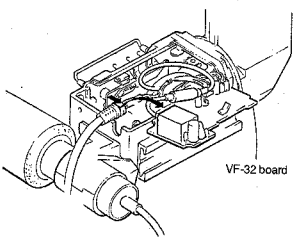


3. Turn the viewfinder upside down and install it.





4. As illustrated below, open the VF-32 board while moving it in the direction of the arrows and open the board so that the component side is placed to the upper position.



5. Set the main POWER switch to ON.

7-7-1. Vertical Hold Adjustment

• Setting

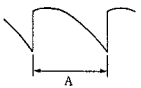
Equipment: Dualtrace Oscilloscope	Board: VF-32 board

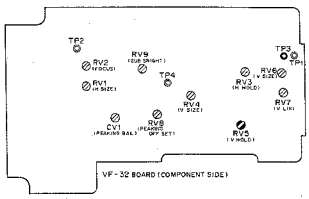
• Preparation

• Extract the EN-79P board from the unit.
• RV6 (V SIZE)/VF-32: mechanical center
(When RV6 is marked, it should not be turned.)

• Adjustment procedures

• Test point : TP3/VF-32
GND E1/VF-32
• Adj. point : ⊘ RV5 /VF-32
(V HOLD)
• Spec. : A = 25.6 ± 0.5ms





• Note

• After adjustment is completed, install the EN-79P board to the unit.

7-7-2. Horizontal Hold Adjustment

• Setting

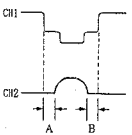
Equipment: Dualtrace Oscilloscope	Board: VF-32 board

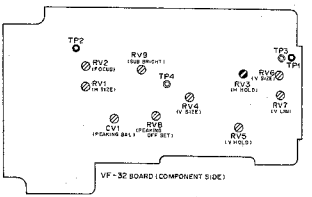
• Preparation

• Shoot the 100% white picture frame and set the white level to 100 ± 2IRE.

• Adjustment procedures

• Test point : CH-1. TP2/VF-32
GND E1
CH-2. TP1/VF-32
GND E1
• Adj. point : ⊘ RV3 (H HOLD) /VF-32
• Spec. : A = B





7-7-3. Bright Set Adjustment

• Setting

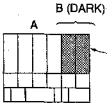
Equipment:	Board: VF-32 board

• Preparation

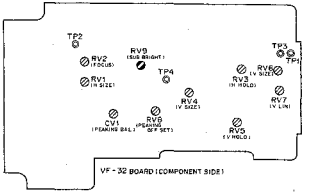
• OUTPUT/DCC switch (side panel)	:	BARS/OFF.
• BRIGHT control (viewfinder)	:	Fully turn counter clockwise.
• CONTRAST control (viewfinder)	:	Fully turn counter clockwise.

• Adjustment procedures

• Test point : Viewfinder
• Adj. point : RV9/VF-32 (SUB BRIGHT)
• Spec. :



Adjust RV9/VF-32 so that portion A can be discriminated from portion B.



7-7-4. Peaking Balance Adjustment

• Setting

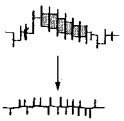
Equipment: Dualtrace Oscilloscope	Board: VF-32 board

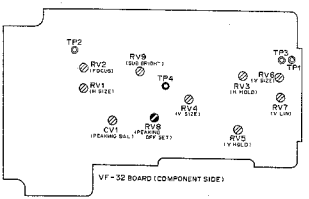
• Preparation

• OUTPUT/DCC switch (side panel) : BARS/OFF

• Adjustment procedures

• Test point : TP4/VF-32
• Adj. point : ⊘ RV8 /VF-32 (PEAKING OFFSET)
• Spec. : Only spike noises should appear at TP4.





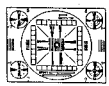
7-7-5. Focus Adjustment

• Setting

Equipment:	Board: VF-32 board

• Preparation

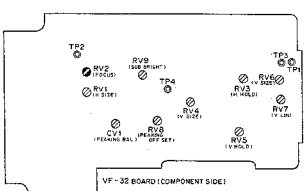
• Shoot the resolution chart in a full picture frame.
• Adjust the iris control so that the output level at the VIDEO OUT terminal is 490 ± 10 mV.
• Adjust so that the LENS FOCUS is set to the best focusing point on the black and white monitor.
• BRIGHT and CONTRAST controls of the viewfinder: mechanical center.



(Viewfinder)

• Adjustment procedures

• Test point : Viewfinder
• Adj. point : ⊘ RV2/VF-32 (FOCUS)
• Spec. : Gradually turn ⊘ RV2 (ANODE SET) on the VF-32 board from fully counterclockwise to clockwise so that the focus is best. (RV should be turned slowly.)



• Note

• After adjustment is completed, check that the focus operation can be performed irrespective of its BRIGHT and CONTRAST controls setting.

7-7-6. Picture Frame Adjustment

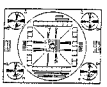
Step 1.

• Setting

Equipment:	Board: VF-32 board

• Preparation

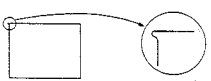
• BRIGHT control (viewfinder) : mechanical center.
• CONTRAST control (viewfinder) : mechanical center.
• PEAKING control (viewfinder) : mechanical center.
• Shoot the resolution chart in a full underscan's picture frame by zooming a lens.

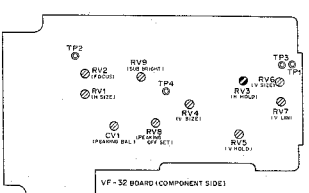


(Monitor)

• Adjustment procedures

• Test point : Viewfinder
• Adj. point : ⊘ RV31 (VF-32)
• Spec. : If the upper left corner of the picture is distorted, make right angle.





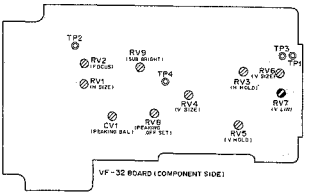
Step 2.

• Setting

Equipment:	Board: VF-32 board

• Adjustment procedures

• Test point	: Viewfinder
• Adj. point	: ⊘ RV7 /VF-32 (V LIN)
• Spec.	: Minimize the distortion of the four circles at the four corners of the resolution chart.



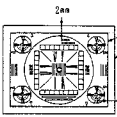
Step 3.

• Setting

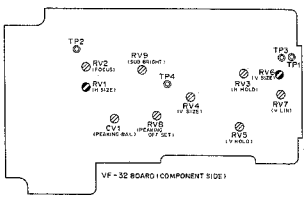
Equipment:	Board: VF-32 board

• Adjustment procedures

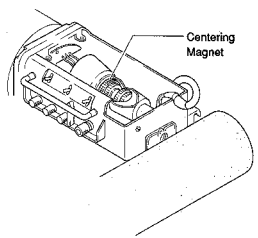
• Test point : Viewfinder
• Adj. point : ✪ RV1/VF-32 (H SIZE)
✪ RV6/VF-32 (V SIZE)
✪ Centering magnet
• Spec. : Adjust RV1 (H SIZE) and RV6 (V SIZE) so that the resolution chart is as shown below.
Turn the centering magnet only when the left and upper corners cannot be adjusted.



(Viewfinder)



(NOTE) When the paint-locked centering magnet is turned, paint-lock it again.



• Note

• After adjustment is completed, close the VF-32 board.
Check that the picture is in the center of the viewfinder in the normal installing position on the unit.

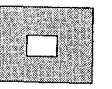
7-7-7. Peaking Level Adjustment

• Setting

Equipment:	Board: VF-32 board

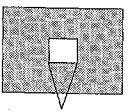
• Preparation

- Shoot the white window chart and adjust the iris control so that the white peak level at the VIDEO OUT terminal is 50 IRE.
- BRIGHT and CONTRAST controls of the viewfinder: mechanical center.
- Turn the PEAKING control (of the viewfinder) from fully clockwise to counterclockwise by 10 degrees.

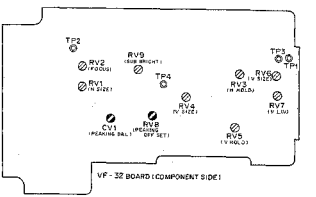


• Adjustment procedures

- Test point : Viewfinder
- Adj. point : ✪ CV1 /VF-32 (PEAKING BAL)
  ✪ RV8 /VF-32 (PEAKING OFFSET)
- Spec. : Adjust the CV1 /VF-32 and RV8 / VF-32 so that the peak level at edges are the same.



The peak level at edges should be the same.

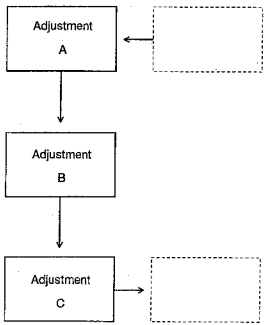


7-8. PARTIAL ADJUSTMENT

Before this adjustment, set the switches referring to the Sec. 7-1-2 Connection and Initial Setting.

7-8-1. Partial Adjustment of Video Signal System

The relation between respective adjustments of the video signal system is shown in Fig. 7-1. Perform the adjustments as described below.



When adjustment B is performed:

① Check that Adjustment A satisfies the specification. (When the specification is not satisfied, readjust it.)

② Perform adjustment B.

③ Check that adjustment C satisfies the specification. If the specification is not satisfied, readjust it.

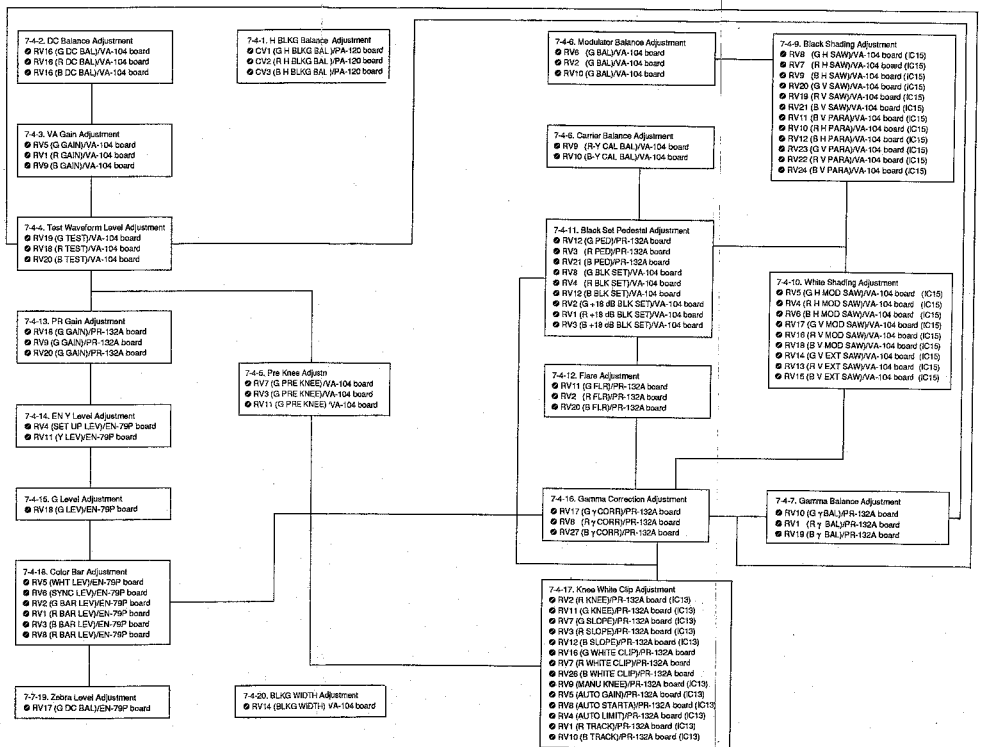

7-4-2. DC Balance Adjustment
RV15 (G DC BAL)/VA-104 board
RV16 (R DC BAL)/VA-104 board
RV16 (B DC BAL)/VA-104 board
7-4-1. H BLKG Balance Adjustment
CV1 (G H BLKG BAL)/PA-120 board
CV2 (R H BLKG BAL)/PA-120 board
CV3 (B H BLKG BAL)/PA-120 board
7-4-6. Modulator Balance Adjustment
RV6 (G BAL)/VA-104 board
RV2 (G BAL)/VA-104 board
RV10 (G BAL)/VA-104 board
7-4-9. Black Shading Adjustment
RV8 (G H SAW)/VA-104 board (IC15)
RV7 (R H SAW)/VA-104 board (IC15)
RV9 (B H SAW)/VA-104 board (IC15)
RV20 (G V SAW)/VA-104 board (IC15)
RV19 (R V SAW)/VA-104 board (IC15)
RV21 (B V SAW)/VA-104 board (IC15)
RV11 (B V PARA)/VA-104 board (IC15)
RV10 (R H PARA)/VA-104 board (IC15)
RV12 (B H PARA)/VA-104 board (IC15)
RV23 (G V PARA)/VA-104 board (IC15)
RV22 (R V PARA)/VA-104 board (IC15)
RV24 (B V PARA)/VA-104 board (IC15)
7-4-3. VA Gain Adjustment
RV5 (G GAIN)/VA-104 board
RV1 (R GAIN)/VA-104 board
RV9 (B GAIN)/VA-104 board
7-4-8. Carrier Balance Adjustment
RV9 (R-Y CAL BAL)/VA-104 board
RV10 (B-Y CAL BAL)/VA-104 board
7-4-4. Test Waveform Level Adjustment
RV19 (G TEST)/VA-104 board
RV18 (R TEST)/VA-104 board
RV20 (B TEST)/VA-104 board
7-4-11. Black Set Pedestal Adjustment
RV12 (G PED)/PR-132A board
RV3 (R PED)/PR-132A board
RV21 (B PED)/PR-132A board
RV8 (G BLK SET)/VA-104 board
RV4 (R BLK SET)/VA-104 board
RV12 (B BLK SET)/VA-104 board
RV2 (G +18 dB BLK SET)/VA-104 board
RV1 (R +18 dB BLK SET)/VA-104 board
RV3 (B +18 dB BLK SET)/VA-104 board
7-4-10. White Shading Adjustment
RV5 (G H MOD SAW)/VA-104 board (IC15)
RV4 (R H MOD SAW)/VA-104 board (IC15)
RV6 (B H MOD SAW)/VA-104 board (IC15)
RV17 (G V MOD SAW)/VA-104 board (IC15)
RV16 (R V MOD SAW)/VA-104 board (IC15)
RV18 (B V MOD SAW)/VA-104 board (IC15)
RV14 (G V EXT SAW)/VA-104 board (IC15)
RV13 (R V EXT SAW)/VA-104 board (IC15)
RV15 (B V EXT SAW)/VA-104 board (IC15)
7-4-13. PR Gain Adjustment
RV18 (G GAIN)/PR-132A board
RV9 (G GAIN)/PR-132A board
RV20 (G GAIN)/PR-132A board
7-4-6. Pre Knee Adjustn
RV7 (G PRE KNEE)/VA-104 board
RV3 (G PRE KNEE)/VA-104 board
RV11 (G PRE KNEE) VA-104 board
7-4-12. Flare Adjustment
RV11 (G FLR)/PR-132A board
RV2 (R FLR)/PR-132A board
RV20 (G FLR)/PR-132A board
7-4-14. EN Y Level Adjustment
RV4 (SET UP LEV)/EN-79P board
RV11 (Y LEV)/EN-79P board
7-4-16. Gamma Correction Adjustment
RV17 (G γCORR)/PR-132A board
RV8 (R γCORR)/PR-132A board
RV27 (B γCORR)/PR-132A board
7-4-7. Gamma Balance Adjustment
RV10 (G γBAL)/PR-132A board
RV1 (R γ BAL)/PR-132A board
RV19 (B γ BAL)/PR-132A board
7-4-15. G Level Adjustment
RV18 (G LEV)/EN-79P board
7-4-18. Color Bar Adjustment
RV5 (WHT LEV)/EN-79P board
RV6 (SYNC LEV)/EN-79P board
RV2 (G BAR LEV)/EN-79P board
RV1 (R BAR LEV)/EN-79P board
RV3 (B BAR LEV)/EN-79P board
RV8 (R BAR LEV)/EN-79P board
7-4-17. Knee White Clip Adjustment
RV2 (R KNEE)/PR-132A board (IC13)
RV11 (G KNEE)/PR-132A board (IC13)
RV7 (G SLOPE)/PR-132A board (IC13)
RV3 (R SLOPE)/PR-132A board (IC13)
RV12 (B SLOPE)/PR-132A board (IC13)
RV16 (G WHITE CLIP)/PR-132A board
RV7 (R WHITE CLIP)/PR-132A board
RV26 (B WHITE CLIP)/PR-132A board
RV9 (MANU KNEE)/PR-132A board (IC13)
RV5 (AUTO GAIN)/PR-132A board (IC13)
RV8 (AUTO STARTA)/PR-132A board (IC13)
RV4 (AUTO LIMIT)/PR-132A board (IC13)
RV1 (R TRACK)/PR-132A board (IC13)
RV10 (B TRACK)/PR-132A board (IC13)
7-7-19. Zebra Level Adjustment
RV17 (G DC BAL)/EN-79P board
7-4-20. BLKG WIDTH Adjustment
RV14 (BLKG WIDTH) VA-104 board

Fig. 7-1

SONY-SP0627 / DRUCK 7

SECTION 8
VTR SYSTEM ALIGNMENT

8-1. PRECAUTIONS ON ADJUSTMENTS

• Boards Extension
When the boards are extended, be sure to turn the POWER switch to OFF position.

【Measuring and adjusting points】

• Alphanumerics in parenthese of specifications and adjustments indicate the location of the adjusted parts and measuring points.

(Ex.)
TP1/PS-162(A-1 C) indicates theat TP1 on the PS-162 board in located in A-1 and mounted on the component side.

• Never touch the variable resistors RV211, RV212, RV213 on the VDA-11P board.

8-2. POWER AND SYSTEM CONTROL ADJUSTMENT

【Equipment】
- Variable DC Power Supply
- Digital Voltmeter
- Blank tape BCT-20K or BCT-20M

【Switches setting on the side panel and function Panel】
Do not change the setting below unless otherwise specified.

• VTR switch	: STBY
• GAIN selector	: 0
• OUTPUT/DCC selector	: CAM/OFF
• WHITE BAL selector	: PRST
• AUDIO IN CH-1/CH-2 switch	: REAR/LINE
• AUDIO SELECT CH-1/CH-2 switch	: AUTO
• F-RUN/R-RUN switch	: R-RUN
• REAL TIME switch	: OFF

8-2-1 BAT +5V Voltage Adjustment

• Setting

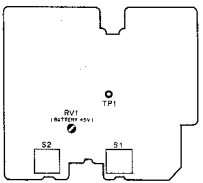
Equipment: Digital Volt Meter	Board: PS-162 board

• Preparation

• DC IN: 12V±0.5Vdc
• Insert a cassette tape and put the unit into the REC mode.

• Adjustment procedures

Test point : TP1/PS-162 (GND : E1/PS162)
Adj. point : ❷RV1 (+5V ADJ)/PS-162
Spec. : +5.5 ±0.02 Vdc



PS-162 BOARD (COMPONENT SIDE)

8-2-2 Battery Voltage Detection Adjustment

• Setting

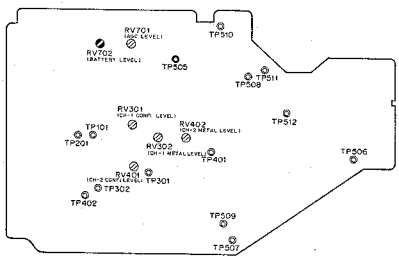
Equipment: Digital Volt Meter	Board: TC-48AP board

• Preparation

- DC IN: 11.50±0.02Vdc
- Insert a cassette tape and put the unit into the REC mode.

• Adjustment procedures

- Test point : TP505/TC-48AP
  GND: E501/TC-48AP
- Adj. Point : ◪RV702
  (BATTERY LEVEL)/TC-48AP
- Spec. : 1.75±0.03Vdc



TC-48A/AP BOARD (SOLDERING SIDE)

8-3. SERVO SYSTEM ADJUSTMENT

【Equipment】
- Dualtrace Oscilloscope
- Blank tape BCT-20K or BCT-20M

【Switches setting on the side panel and function panel】
Do not change the setting below unless otherwise specified.

• VTR switch	: STBY
• GAIN selector	: 0
• OUTPUT/DCC selector	: CAM/OFF
• WHITE BAL selector	: PRST
• AUDIO IN CH-1/CH2 switch	: REAR/LINE
• AUDIO SELECT CH-1/CH-2 switch	: AUTO
• F-RUN/R-RUN switch	: R-RUN
• REAL TIME switch	: OFF

8-3-1 Capstan FG-B Adjustment

• Setting

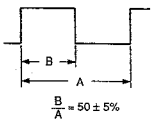
Equipment: Dualtrace Oscilloscope	Board: SV-97AP board

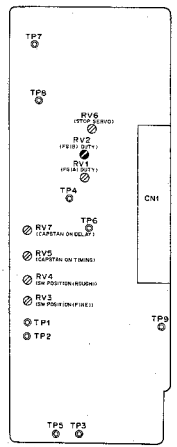
• Preparation

• Insert the BCT-20M or BCT-20K and put the unit into the PLAY mode.

• Adjustment procedures

• Test point : TP27/Extension board
• Adj. point : ⊘RV2/SV-97AP
• Spec. : $\frac{B}{A}$ ≈50±5%





SV-97A/AP BOARD (COMPONENT SIDE)

8-3-2 Stop Servo Adjustment

• Setting

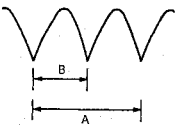
Equipment: Dualtrace Oscilloscope	Board: SV-97AP board

• Preparation

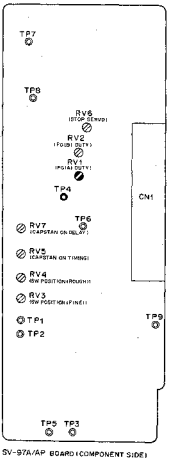
• Insert the BCT-20M or BCT-20K and put the unit into the PLAY mode. (Adj1) and the STOP mode (Adj2).

• Adjustment procedures

1 Test point : TP4/SV-97AP
Adj. point : ⊘RV1/SV-97AP
Spec. : $\frac{B}{A}$ =50±5% (PLAY mode)

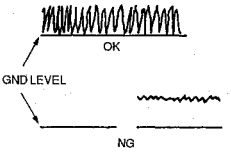


TRIG: TP27/Extension board



SV-97A/AP BOARD (COMPONENT SIDE)

2 Test point : TP4/SV-97AP
Adj. point : RV1/SV-97AP
Spec. : (STOP mode)



TRIG: TP27/Extension board

9. SYSTEM ALIGNMENT

8-3-3 Composite Shooting Adjustment

• Setting

Equipment: Dualtrace Oscilloscope	Board: SV-97AP board

• Preparation

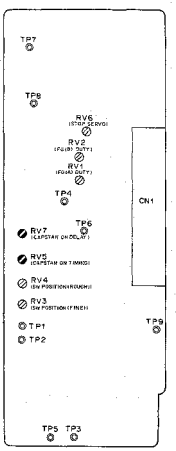
- Insert the BCT-20M or BCT-20K.
- Connect the Servo Remote Control Tool to connector CN2 on the SV-97AP board.
- Short between TP11 and TP1 on the extension board with a shorting clip.
- Short between TP9 on the SV-97AP board and TP18 on the extension board with a shorting clip.

• Adjustment procedures

1. • REC SERVO switch/Servo Remote Control Tool : ON
   • Test point : TP7/Extension board
   • Spec. : Check that the signal at TP7 is set low, high, and low (for 80 seconds (max)).

2. • REC SERVO switch/Servo Remote Control Tool : OFF
   • Test point : TP8/Extension board
   • Adj. point : ⊘RV5/SV-97AP
   • Spec. : Adjust so that the high signal at TP8 is set low.

3. • Test point : TP10/Extension board
   • Adj. point : ⊘RV7/SV-97AP
   • Spec. : Adjust so that the high signal at TP10 is set low.



SV-97A/AP BOARD (COMPONENT SIDE)

• Note

After adjustment is completed, remove the shorting clips and set the connector to the former position.

8-4. AUDIO SYSTEM ADJUSTMENT

【Equipment】
- Low-frequency Oscillator
- Audio Noise Meter
- DC Voltmeter
- Frequency Counter
- Modulation Analyzer
- PB Adaptor: VA-500 or VA-510
- Blank tape BCT-20K or BCT-20M
- Alignment tape: CR8-1APS (8-960-098-45) : OXIDE
  CR8-1BPS (8-960-096-86) : METAL

*Alignment tape: CR8-1APS

TIME min. sec	AUDIO TRACK
0:00	1KHz, OVU
2:55	Blank
3:00	10KHz, –10VU
4:55	Blank
5:00	1KHz, –20VU
5:55	Blank
6:00	40Hz, –20VU 7KHz, –20VU 10KHz, –20VU 15KHz, –20VU
7:55	Blank
8:00	1KHz sine wave (for audio & CTL height)
10:00	

*Alignment tape: CR8-1BPS

TIME min. sec	AUDIO TRACK
0:00	1KHz, OVU
2:55	Blank
3:00	15KHz, OVU
4:55	Blank
5:00	1KHz, –20VU
5:55	Blank
6:00	40Hz, –20VU 7KHz, –20VU 10KHz, –20VU 15KHz, –20VU
7:55	

【Switches setting on the side panel】
Do not change the setting below unless otherwise specified.

- AUDIO SELECT CH-1/CH-2 switch : AUTO
- MONITOR switch : PB
- MONITOR SELECT switch : MIX
- AUDIO IN switch : LINE
- DOLBY NR switch : OFF

【Note】
- 0dBu=0.775Vrms
- Put the Audio Noise Meter into rms mode.
- "WEIGHTING" in the specifications column shows WEIGHTING mode of the audio Noise Meter.
  DIN AUDIO: 22Hz to 22kHz BPF

8-4-1 Level Volume Reference Position Adjustment

• Setting

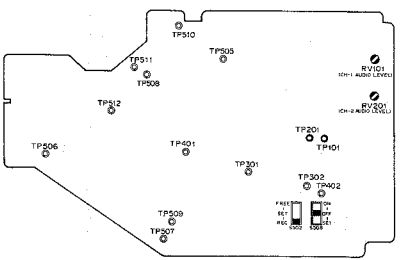
Equipment: Audio Noise Meter	Board: TC-48AP board

• Preparation

- AUDIO SELECT CH-1/CH-2 SW→MAN
- AUDIO IN CH-1/CH-2 connector: 1kHz, + 4dBu
- EJECT mode

• Adjustment procedures

- Test point : CH-1 : TP101/TC-48AP
  CH-2 : TP201/TC-48AP
- Adj. point : CH-1 : ⊘RV101 (CH-1 AUDIO LEVEL)/TC-48AP (side panel)
  CH-2 : ⊘RV201 (CH-2 AUDIO LEVEL)/TC-48AP (side panel)
- Spec. : −10.0±0.1dBu
  WEIGHTING: DIN AUDIO



• Note

The adjustment level in this section is used as an audio system's reference level. After that, never turn RV101 and RV201 during audio system adjustment.

8-4-2 Level Meter Adjustment

• Setting

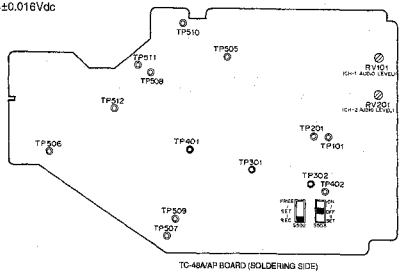
Equipment: DC Volt Meter	Board: TC-48AP board

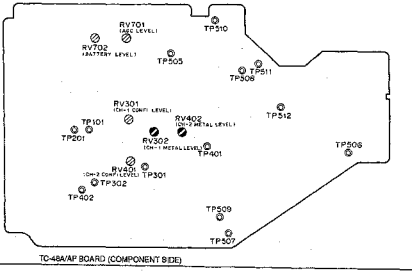
• Preparation

- AUDIO SELECT CH-1/CH-2 SW→MAN
- AUDIO IN CH-1/CH-2 connector: 1kHz, +4dBu
- DC Voltmeter

• Adjustment procedures

Test point : CH-1 : TP301/TC-48AP
CH-2 : TP401/TC-48AP
Adj. point : CH-1 : ⊘RV302 (CH-1 LEVEL)/TC-48AP
CH-2 : ⊘RV402 (CH-2 LEVEL)/TC-48AP
Spec. : +1.104±0.016Vdc





8-4-3 CONFI Level Adjustment

• Setting

Equipment: Audio Noise Meter	Board: TC-48AP board

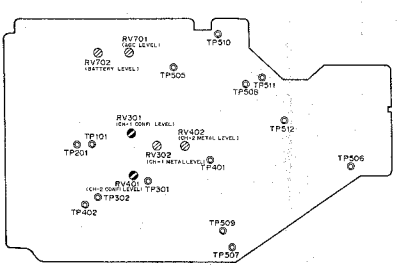
• Preparation

- AUDIO IN CH-1/CH-2 connector: 1kHz, +4dBu
- MONITOR SELECT SW → CH-1
- MONITOR control (side panel): Fully turn clockwise
- Insert the alignment tape CR5-1A and put the unit into the STOP mode.

• Adjustment procedures

- Test point : EARPHONE connector (8-ohm load)
- Adj. point : ① ⊘RV301 (CH-1 CONFI LEVEL)/TC-48AP
  ② ⊘RV401 (CH-1 CONFI LEVEL)/TC-48AP
- Spec. : ① (Calibrated value in adjustment procedure1) ±0.1dB
  ② (Calibrated value in adjustment procedure1) ±1dB

1. Take a note of the level at the EARPHONE Connector (8 load)
2. Play back the audio 1KHz/0dB portion of the alignment tape CR8-1APS.
3. Adjust ⊘RV301 (CH-1 CONFI LEVEL)/TC-48A to ±0.1dB of the value calibrated in 1.
4. Set the MONITOR SELECT SW to CH-2.
5. Play back the audio 1KHz/0dB portion of the alignment tape CR8-1APS
6. Adjust ⊘RV401 (CH-2 CONFI LEVEL)/TC-48A to ±1dB of the value calibrated in 1.



TC-48A/P BOARD (SOLDERING SIDE)

• Note

- After having been adjusted, the monitor switch should be put into MIX.

8-4-4 CONFI TC Cancel Adjustment

• Setting

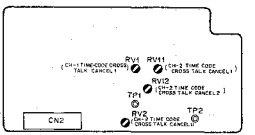
Equipment: Audio Noise Meter	Board: TB-5 board

• Preparation

- AUDIO IN CH-1/CH-2 connector: 1kHz, +4dBu
- MONITOR control (side panel): Fully turn clockwise
- Insert the BCT-20M and put the unit into the REC mode.

• Adjustment procedures

- Test point : EARPHONE connector (8-ohm load)
- Adj. point : CH-1 : ●RV1/TB-5, ●RV2/TB-5
  CH-2 : ●RV11/TB-5, ●RV12/TB-5
- Spec. : Minimize the level.
  WEIGHTING: CCIR ARM



TB-5 BOARD (COMPONENT SIDE)

8-4-5 Dolby Input Level Adjustment

• Setting

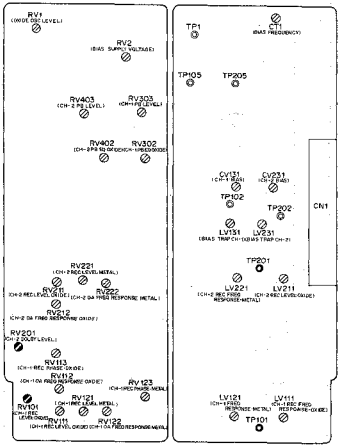
Equipment: Audio Noise Meter	Board: AU-97P board

• Preparation

• AUDIO IN CH-1/CH-2 connector: 1kHz, +4dBu
• Insert the BCT-20K

• Adjustment procedures

• Test point : CH-1 : TP101/AU-97P
CH-2 : TP201/AU-97P
• Adj. point : ●RV101 (CH-1 DOLBY LEVEL)/AU-97P
●RV201 (CH-2 DOLBY LEVEL)/AU-97P
• Spec. : −10.0±0.1dBu
WEIGHTING: DIN AUDIO



8-4-6 Bias Supply Voltage Adjustment

• Setting

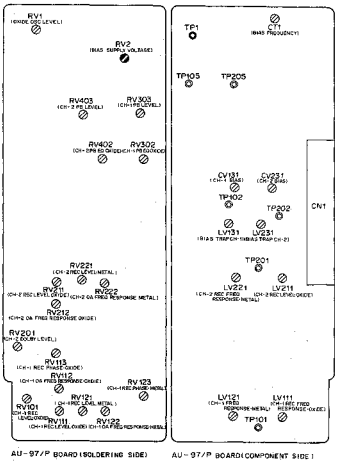
Equipment: DC Voltmeter	Board: AU-97P board

• Preparation

• Insert the BCT-20M and put the unit into the REC mode.

• Adjustment procedures

• Test point : TP1/AU-97P
• Adj. point : ✔RV2/AU-97P
• Spec. : +10.00±0.01Vdc



8-4-7 Bias Trap Adjustment

• Setting

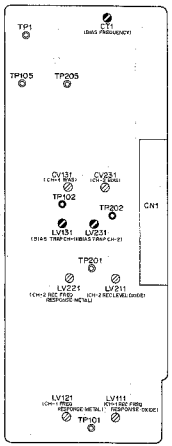
Equipment: Frequency Counter	Board: AU-97P board

• Preparation

• AUDIO IN CH-1/CH-2 connector: No signal
• Insert the BCT-20M and put the unit into the REC mode.
• Connect the Frequency Counter to AC OUT connector on the Audio Noise Meter.

• Adjustment procedures

• Test point : CH-1 : TP102/AU-97P
CH-2 : TP202/AU-97P
• Adj. point : ① Bias frequency ⊘CT1/AU-97P
② Trap
CH-1 : ⊘LV131 (CH-1 BIAS TRAP)/AU-97P
CH-2 : ⊘LV231 (CH-2 BIAS TRAP)/AU-97P
• Spec. : ① 134±0.5kHz
② Minimize the level. (+13dBu or less)
WEIGHTING: WIDE BAND



AU-97P BOARD(COMPONENT SIDE)

8-4-8 Bias Current Adjustment

Step 1

• Note

• CH-1 and CH-2 should be adjusted at the same time.

• Setting

Equipment: Audio Noise Meter	Board: AU-97P board

• Preparation

• AUDIO SELECT CH-1/CH-2 SW→MAN • Preset RV1/AU-97P to the mechanical center. • AUDIO IN CH-1/CH-2 connector: 5kHz, +4dBu • MONITOR control (side panel): Fully turn clockwise CH-1 Adjustment • MONITOR SELECT SW → CH-1 CH-2 Adjustment • MONITOR SELECT SW → CH-2

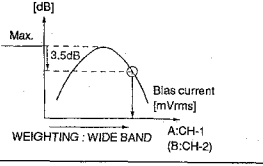
• Adjustment procedures

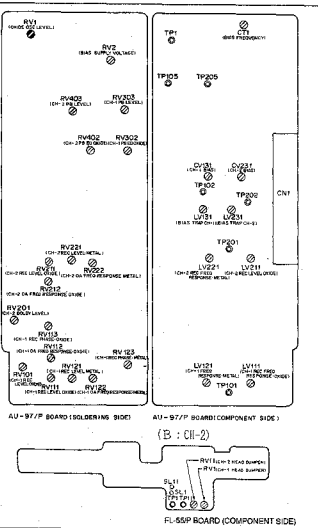
• Test point : CH-1 Adjustment
PB level: EARPHONE connector
Bias current: TP1/FL-55P
GND: E1/FL-55P
CH-2 Adjustment
PB level: EARPHONE connector
Bias current: TP11/FL-55P
GND: E1/FL-55P

• Adj. point : CH-1: ●CV131 (CH-1 BIAS)/AU-97P
CH-2: ●CV231 (CH-2 BIAS)/AU-97P
* IF the adjustment is not completed by CV131 and CV231, adjust by ●RV1/AU-97P

• Spec. : PB level

1. Insert the BCT-20K and put the unit into the REC mode.
2. Minimize the level.
3. Increase the bias current and maximize the PB level.
4. Further increase the bias current, and lower the PB level by 3.5dB from max level.
5. Take notes of the bias current A: CH-1 (B: CH-2).





Step 2

• Setting

Equipment: Audio Noise Meter	Board: AU-97P board

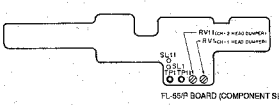
• Preparation

- AUDIO SELECT CH-1/CH-2 SW→MAIN
- Preset RV1/AU-97P to the mechanical center.
- AUDIO IN CH-1/CH2 connector: 5kHz, + 4dBu
- MONITOR control (side panel): Fully turn clockwise.

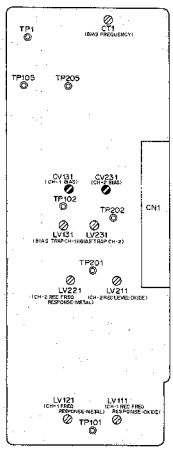
• Adjustment procedures

- Test point : CH-1 : TP1/FL-55P
  CH-2 : TP11/FL-55P
  (GND : E1/FL-55P)
- Adj. point : CH-1 : ⊘CV131 (CH-1 BIAS)/AU-97P
  CH-2 : ⊘CV231 (CH-2 BIAS)/AU-97P (BCT-20M)
  CH-1/CH-2=⊘RV-1/AU-97P ..... (BCT-20K)
- Spec. : CH-1 : A+3±0.1mVrms
  CH-2 : B+3±0.1mVrms (BCT-20M)
- Spec. : CH-1 : A±0.1mVrms
  CH-2 : B±0.1mVrms (BCT-20K)
  WEIGHTING: WIDE BAND

1. Insert a blank tape (BCT-20M), and set the unit to the REC mode.
2. Assuming the values you took a note of in Step 1 as A and B, adjust as follows:
   CH-1 : A+3±0.1mVrms
   CH-2 : B+3±0.1mVrms
3. Insert a blank tape (BCT-20K), and set the unit to the REC mode.
4. Adjust to:
   CH-1 : A±0.1mVrms
   CH-2 : B±0.1mVrms



FL-55/P BOARD (COMPONENT SIDE)



AU-97/P BOARD (COMPONENT SIDE)

• Note

1: The bias frequency should be 134±0.5kHz.
2: After adjustments in step3 and 4 are completed, disconnect the extension board and install the AU-97P board on the unit then check the specification. If the specification is shifted, readjust step2 taking it into account.

8-4-9 Recording Current Tentative Adjustment

• Setting

Equipment: Audio Noise Meter	Board: AU-97P board

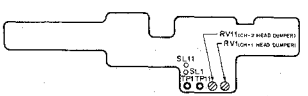
• Preparation

• AUDIO SELECT CH-1/CH-2 SW→MAN
• AUDIO IN CH-1/CH-2 connector: 1kHz, +4dBu

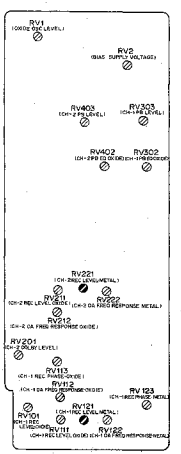
• Adjustment procedures

• Test point : BVW-400→REC mode
CH-1 : TP1/FL-55P
CH-2 : TP11/FL-55P
(GND : E1/F1-55P)
• Adj. point : CH-1 : ❷RV121/AU-97P
CH-2 : ❷RV221/AU-97P
• Spec. : +4.0±0.1dBM
WEIGHTING: DIN AUDIO

1. Insert the BCT-20M and put the unit into the REC mode.
2. Play back the recorded tape using a standard VTR (BVW-75 or the equivalent).
3. DOLBY NR ON/OFF→OFF
4. LINE OUT CH-1/CH-2connector: Standard VTR (Terminated in 600 ohms.)
5. If the specification is not satisfied, perform the following adjustment.
6. Replace the blank tape with an oxide tape (BCT-20K), and execute adjustment procedures 1 through 5.



FL-55/P BOARD (COMPONENT SIDE)



AU-97/P BOARD (SOLDERING SIDE)

8-4-10 Overall Frequency Response Adjustment (Metal)

• Setting

Equipment: Audio Noise Meter	Board: AU-97P board

• Preparation

• AUDIO SELECT CH-1/CH-2 SW→MAN

• Adjustment procedures

• Test point : BVW-400→REC mode
CH-1 : TP1/FL-55P
CH-2 : TP11/FL-55P
(GND : E1/FL-55P)

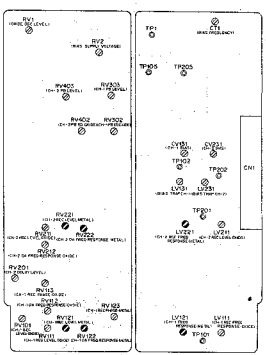
• Adj. point : CH-1 : ●RV122/AU-97P (7~10kHz)
CH-2 : ●RV222/AU-97P
CH-1 : ●RV121/AU-97P (near 15kHz)
CH-2 : ●RV221/AU-97P

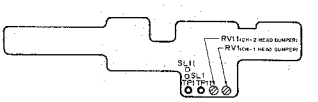
• Spec.

frequency	level (dB)
40Hz	Ref $^{+1.5}_{-3}$
1kHz	Reference
7kHz	Ref ±1
10kHz	Ref $^{+1}_{-1.5}$
15kHz	Ref $^{+1}_{-2}$

WEIGHTING: WIDE BAND

1. Insert the BCT-20M and put the unit into the REC mode.
2. Sequentially supply 40Hz, 1kHz, 7kHz, 10kHz and 15kHz/–16dBu signals to the AUDIO IN CH-1/CH-2 connector for thirty seconds.
3. Play back the recorded tape using a standard VTR (BVW-75 or the equivalent).
4. Correct the overage and shortage of the level in the check procedure and confirm that the required specification is satisfied.
: When the intermediate frequency is low
CH-1 : Turn●RV122/AU-97P counterclockwise.
CH-2 : Turn●RV222/AU-97P counterclockwise.
: When the intermediate frequency is high
CH-1 : Turn●RV122/AU-97P clockwise.
CH-2 : Turn●RV222/AU-97P clockwise.
: When the high frequency is low (near 15kHz)
CH-1 : Turn●LV121/AU-97P clockwise.
CH-2 : Turn●LV221/AU-97P clockwise.
: When the high frequency is high
CH-1 : Turn●LV121/AU-97P counterclockwise.
CH-2 : Turn●LV221/AU-97P counterclockwise.





8-4-11 Overall Frequency Response Adjustment (Oxide)

• Setting

Equipment: Audio Noise Meter	Board: AU-97P board

• Preparation

• AUDIO SELECT CH-1/CH-2 SW→MAN
• DOLBY NR ON/OFF SW→ON

• Adjustment procedures

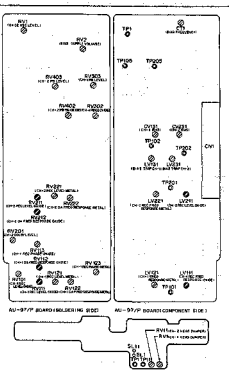
• Test point : BVW-400→REC mode
CH-1 : TP1/FL-55P
CH-2 : TP11/FL-55P
(GND : E1/FL-55P)

• Adj. point : CH-1 : ⊘RV112/AU-97P (7~10kHz)
CH-2 : ⊘RV212/AU-97P
CH-1 : ⊘RV111/AU-97P (near 15kHz)
CH-2 : ⊘RV211/AU-97P

• Spec.

frequency	level (dB)
40Hz	Ref ±3.0
1kHz	Reference
7kHz	Ref ±1
10kHz	Ref $^{+1}_{-1.5}$
15kHz	Ref $^{+1}_{-2}$

WEIGHTING: WIDE BAND



FL-55P BOARD (COMPONENT SIDE)

1. Insert the BCT-20K and put the unit into the REC mode.
2. Sequentially supply 40Hz, 1kHz, 7kHz, 10kHz and 15kHz/−16dBu signals to the AUDIO IN CH-1/CH-2 connector for thirty seconds.
3. Play back the recorded tape using a standard VTR (BVW-75 or the equivalent).
(DOLBY NR ON/OFF SW→ON)
LINE OUT CH-1/CH-2 connector: Standard VTR (Terminated in 600 ohms.)
4. Correct the overage and shortage of the level in the check procedure and confirm that the required specification is satisfied.

: When the intermediate frequency is low (7 to 10kHz)
CH-1 : Turn⊘RV112/AU-97P counterclockwise.
CH-2 : Turn⊘RV212/AU-97P counterclockwise.
: When the intermediate frequency is high
CH-1 : Turn⊘RV112/AU-97P clockwise.
CH-2 : Turn⊘RV212/AU-97P clockwise.

: When the high frequency is low (near 15kHz)
CH-1 : Turn⊘LV111/AU-97P clockwise.
CH-2 : Turn⊘LV211/AU-97P clockwise.
: When the high frequency is high
CH-1 : Turn⊘LV111/AU-97P counterclockwise.
CH-2 : Turn⊘LV211/AU-97P counterclockwise.

• Note

• After adjustment is completed, turn the DOLBY NR ON/OFF switch to OFF.

8-4-12 Overall Recording Current Adjustment

• Setting

Equipment: Audio Noise Meter	Board: AU-97P board

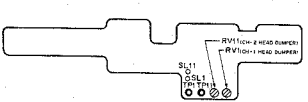
• Preparation

• AUDIO SELECT CH-1/CH-2 SW→MAN
• AUDIO IN CH-1/CH-2 connector: 1kHz, + 4dBu

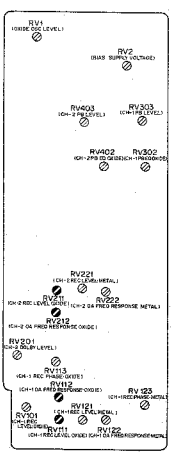
• Adjustment procedures

• Test point : BVW-400→REC mode
CH-1 : TP1/FL-55P
CH-2 : TP11/FL-55P
(GND : E1/F1-55P)
• Adj. point : CH-1 : ●RV112/AU-97P)
CH-2 : ●RV212/AU-97P)
CH-1 : ●RV111/AU-97P) (BCT-20M)
CH-2 : ●RV211/AU-97P)
• Spec. : + 4.0 ±0.1dBm
WEIGHTING: DIN AUDIO

1. Insert the BCT-20M and put the unit into the REC mode.
2. Play back the recorded tape using a standard VTR (BVW-75 or the equivalent).
   • LINE OUT CH-1/CH-2 connector: Standard VTR (Terminated in 600 ohms.)
3. Correct the overage and shortage of the level in the check procedure and confirm that the required specification is satisfied.
4. Replace with a blank tape (BCT-20K), and execute steps 1 through 3 (Set DOLBY NR ON/OFF SW to OFF).



FL-55P BOARD (COMPONENT SIDE)



AU-97/P BOARD (SOLDERING SIDE)

8-4-13 Channel-to-Channel Phase adjustment (Oxide)

• Setting

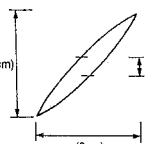
Equipment: Dualtrace Oscilloscope	Board: AU-97P board

• Preparation

• AUDIO SELECT CH-1/CH-2 SW→MAN
• AUDIO IN CH-1/CH-2 connector: 15kHz, + 4dBu

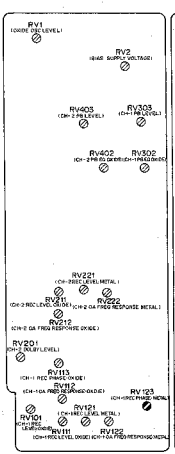
• Adjustment procedures

• Test point : BVW-400→REC mode
CH-1 : TP102/AU-97P
CH-2 : TP202/AU-97P
• Adj. point : ⊘RV113 (CH-1 REC PHASE)/AU-97P
• Spec.



Oscilloscope : XY mode

1. Insert the BCT-20K and put the unit into the REC mode.
2. Play back the recorded tape using a standard VTR (BVW-75 or the equivalent).
LINE OUT CH-1/CH-2 connector: Standard VTR
(Terminated in 600 ohms.)
3. Short between TP35 and TP47 on the extension board with the shorting clip.
4. Correct the shifted portion of the phase in the check procedure and confirm that the required specification is satisfied.



AU-97/P BOARD (SOLDERING SIDE)　AU-97/P BOARD (COMPONENT SIDE)

• Note

• After adjustment is completed, remove the shorting clip.

8-4-14 Channel-to-Channel Phase adjustment (Metal)

• Setting

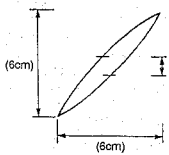
Equipment: Dualtrace Oscilloscope	Board: AU-97P board

• Preparation

• AUDIO SELECT CH-1/CH-2 SW→MAN
• AUDIO IN CH-1/CH-2 connector: 15kHz, + 4dBu

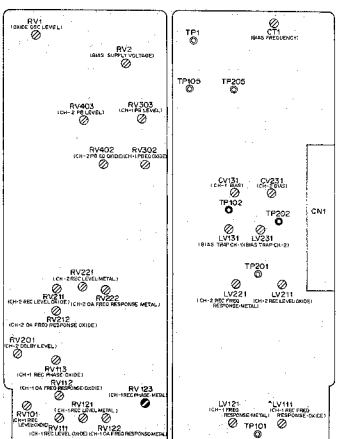
• Adjustment procedures

• Test point : BVW-400→REC mode
CH-1 : TP102/AU-97P
CH-2 : TP202/AU-97P
• Adj. point : ❷RV123 (CH-1 REC PHASE)/AU-97P
• Spec.



Oscilloscope : XY mode

1. Insert the BCT-20K and put the unit into the REC mode.
2. Play back the recorded tape using a standard VTR (BVW-75 or the equivalent).
LINE OUT CH-1/CH-2 connector: Standard VTR (Terminated in 600 ohms.)
3. Short between TP35 and TP47 on the extension board with the shorting clip.
4. Correct the shifted portion of the phase in the check procedure and confirm that the required specification is satisfied.



• Note

• After adjustment is completed, remove the shorting clip.

8-4-15 PB Amp Reference Level Adjustment

• Setting

Equipment: Audio Noise Meter	Board: AU-97P board

• Preparation

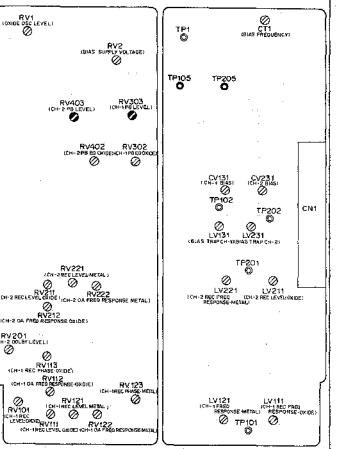
• AUDIO SELECT CH-1/CH-2 SW→MAN

• Adjustment procedures

• Test point: CH-1 : TP105/AU-97P
CH-2 : TP205/AU-97P
• Adj. point: CH-1 : ●RV303 (CH-1 PB LEVEL)/AU-97P
CH-2 : ●RV403 (CH-2 PB LEVEL)/AU-97P
• Spec. : ① −10.0 ±0.1dBμ
② $-10.0\ ^{+0.5}_{-1.5}$ dBμ

WEIGHT: DIN AUDIO

1. AUDIO IN CH-1/CH-2 connector: 1kHz, +4dBu
2. Insert the BCT-20K and put the unit into the REC mode.
3. Play back the self-recorded portion.
4. Adjust to Standard ①.
5. Playback the audio 1KHz/0dB portion of the alignment tape CR8-1APS.
6. Adjust to Standard ②.
7. If the specification is not satisfied, readjust step 1. But if not, perform the audio head height adjustment in Sec. 6-13.



8-4-16 PB Amp Frequency Respone Adjustment

Step 1

• Setting

Equipment: Audio Noise Meter	Board: AU-97P board

• Preparation

- AUDIO SELECT CH-1/CH-2 SW→MAN
- DOLBY NR ON/OFF SW→ON
- Connect the PB Adaptor (VA-500 or VA-510). (DOLBY NR ON/OFF SW→ON)
- Insert the BCT-20K and put the unit into the REC mode.
- Sequentially supply 40Hz, 1kHz, 7kHz, 10kHz and 15kHz/–16dBu signals to the AUDIO IN CH-1/CH-2 connector for thirty seconds.
- Select the Audio PB channel CH-1/CH-2 of the PB Adaptor and perform the adjustment. (Spec①)
- Insert the BCT-20M and put the unit into the REC mode.
- Sequentially supply 40Hz, 1kHz, 7kHz, 10kHz and 15kHz/–16dBu signals to the AUDIO IN CH-1/CH-2 connector for thirty seconds.
- Select the Audio PB channel CH-1/CH-2 of the PB Adaptor and perform the adjustment. (Spec②)
- AUDIO OUT connector/PB Adaptor (Terminated in 600 ohms.)

• Adjustment procedures

- Test point : CH-1 : TP1/FL-55P
  CH-2 : TP11/FL-55P
- Adj. point : Intermediate-frequency response
  CH-1 : ❷RV302 (CH-1 PB EQ)/AU-97P
  CH-2 : ❷RV402 (CH-2 PB EQ)/AU-97P
  High-frequency response
  CH-1 : ❷RV1 (CH-1 HEAD DUMPER) FL-55P
  CH-2 : ❷RV11 (CH-2 HEAD DUMPER) FL-55P
- Spec.

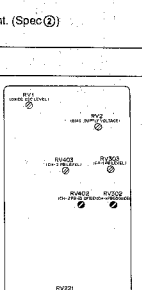
① Oxide

Frequency	Level (dB)
40Hz	Ref ±3
1kHz	Reference
7kHz	Ref ±1
10kHz	Ref $^{+1}_{-1.5}$
15kHz	Ref $^{+1}_{-2}$

② Metal

Frequency	Level (dB)
40Hz	Ref $^{+1.5}_{-3}$
1kHz	Reference
7kHz	Ref ±1
10kHz	Ref $^{+1}_{-1.5}$
15kHz	Ref $^{+1}_{-2}$

WEIGHTING: WIDE BAND



AU-97P BOARD (SOLDERING SIDE)

Adjust so that the specifications of the oxide and metal are satisfied.
When the high-frequency level is low after ❷RV1 and ❷RV11 on the FL board are turned fully clockwise, solder the points below and readjust.

FL-55P BOARD (COMPONENT SIDE)

• Note

- After adjustment is completed, disconnect the PB Adaptor.

Step 2
• Setting

Equipment: Audio Noise Meter	Board: AU-97P board

• Preparation

- AUDIO SELECT CH-1/CH-2 SW→MAN
- DOLBY NR ON/OFF SW→ON
- Play back the audio 1kHz (reference), 40Hz, 7kHz, 10kHz and 15kHz signals on the alignment, tape CR8-1APS.
- AUDIO OUT connector/PB Adaptor (terminated in 600 ohms.)

• Adjustment procedures

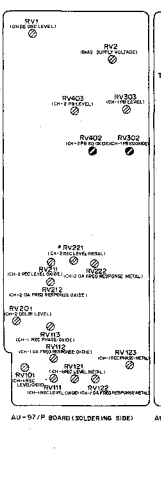
- Test point : CH-1 : TP105/AU-97P
  CH-2 : TP205/AU-97P
- Adj. point : Intermediate-frequency response
  CH-1 : ●RV302 (CH-1 PB EQ)/AU-97P
  CH-2 : ●RV402 (CH-2 PB EQ)/AU-97P
  High-frequency response
  CH-1 : ●RV1 (CH-1 HEAD DUMPER) FL-55P
  CH-2 : ●RV11 (CH-2 HEAD DUMPER) FL-55P
- Spec.

Frequency	Level (dB)
40Hz	Ref ±3
1kHz	Reference
7kHz	Ref ±3
10kHz	Ref ±3
15kHz	Ref ±3

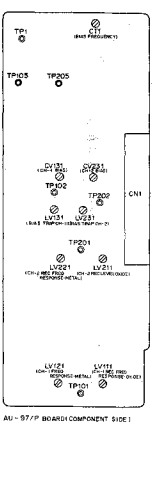
WEIGHTING: WIDE BAND

- If the specification is not satisfied, readjust step 1. But if not, perform the tape run alignment in Sec. 6.

FL-55P BOARD (COMPONENT SIDE)



AU-97/P BOARD (SOLDERING SIDE)



AU-97/P BOARD (COMPONENT SIDE)

8-4-17 AFM Carrier Frequency Adjustment

• Setting

Equipment: Frequency Counter	Board: AFM-6P board

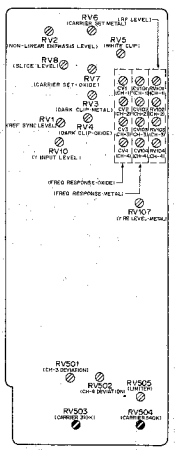
• Preparation

- AUDIO IN CH-1/CH-2 connector: No signal
- Insert the BCT-20M and put the unit into the REC mode.

• Adjustment procedures

1. CARRIER 310KHz Adj.
- Test point : TP35/Extension board: AFM-6P
- Adj. point : ⊘RV503/AFM-6P
- Spec. : 310±1KHz

2. CARRIER 540KHz Adj.
- Test point : TP36/Extension board; AFM-6P
- Adj. point : ⊘RV504/AFM-6P
- Spec. : 540±1KHz



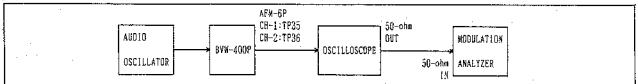
AFM-6/P BOARD(SOLDERING SIDE)

8-4-18 AFM Deviation Adjustment

• Setting

Equipment: Frequency Counter	Board: AFM-6P board

• Connection

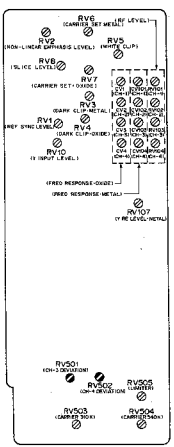


• Preparation

• AUDIO IN CH-1/CH-2 connector: 400Hz, +4dBu (Ref. Level)
• Insert the BCT-20M and put the unit into the REC mode.

• Adjustment procedures

1. CH-3 DEVIATION
• Test point : TP505/AFM-6P
• Adj. point : ●RV501/AFM-6P
• Spec. : +4±0.1dBm
2. CH-4 DEVIATION
• Test point : TP506/AFM-6P
• Adj. point : ●RV502/AFM-6P
• Spec. : +4±0.1dBm



AFM-6/P BOARD(SOLDERING SIDE)

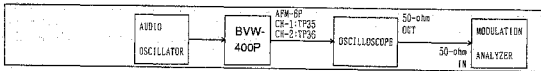
8-4-16 AFM Over Modulation Limiter Adjustment

Step

• Setting

Equipment: Frequency counter	Board: AFM-6P board

• Connection



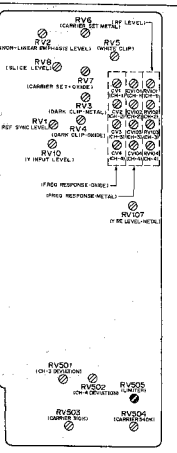
• Preparation

- S103/TC-48A→OFF
- S203/TC-48A→OFF
- AUDIO SELECT
  CH-1/CH-2 SW→MAN
- AUDIO IN CH-1/CH-2 SW →REAR MIC
- AUDIO IN CH-1/CH-2 connector: 400Hz, −40dBu (Ref. level +20dBu)
- Insert the BCT-20M and put the unit into the REC mode.

• Adjustment procedures

- Test point : CH-1 : TP505/AFM-6P
  CH-2 : TP506/AFM-6P
- Adj. point : ⊘RV505/AFM-6P
- Spec. : 77±2kHz

The point where a wave-form starts to be distorted.



• Note

- After adjustment is completed, set the S103 and S203 on the TC-48A board to ON.

8-5. VIDEO SYSTEM ADJUSTMENT

【Equipment】

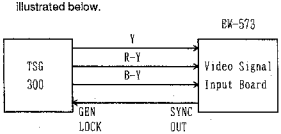
- Component signal Generator: TEKTRONIX TSG-300 or the equivalent
- Digital Voltmeter
- Dual trace Oscilloscope
- Frequency counter
- Sweep Generator
- Spectrum Analyzer
- DC power: AC-500 or the equivalent
- Waveform Vector Monitor: TEKTRONIX 1750 or the equivalent
- Standard VTR player: BVW-75 or the equivalent
- Rec Current Adj Tool (EW-571)
- Video signal Input Board: EW-573
- Blank tape: BCT-20K or BCT-20M
- Alignment Tape: CR5-2APS (8-960-098-44) : OXIDE
  CR5-1BPS (8-960-096-91) : METAL

【Switches setting on the function panel】
Do not change the setting below unless otherwise specified.

- VTR switch: STBY
- OUTPUT/DCC selector: BARS

【Preparation】 (When using the signal exept from the built-in color-bar.)

1. Remove the EN-79P board.
2. Insert the Video Signal Input Board and connect as illustrated below.



3. After adjustment is completed, install the EN-79 board and check (or readjust) Sec. 8-5-3 and 8-5-14 using a BARS signal from the camera.

*Alignment tape: CR5-2APS

TIME min.sec	VIDEO TRACK	DESCRIPTION
0:00	75% Color Bar	
3:00	Multi Burst	Y : 0.5,1,2,3,4.1,4.5 MHz C : 0.2,0.5,1,1.5 MHz
6:00	Bowtie & 10T	C : No Signal
9:00	Pulse & Bar	
11:00	Sw'P Shifted	
13:00	Composite Monoscope	Video Phase
15:00		

*Alignment tape: CR5-1BPS

TIME min.sec	VIDEO	AFM
0:00	RF SWEEP Marker 1, 2, 4, 6, 8, 10, 12 MHz	
2:00	60% H, SWEEP (CTDM) Marker 0.5, 1, 2, 3, 4, 5 MHz	
5:00	PULSE & BAR (CTDM)	No-Signal
8:00	MULTI BURST Y : 0.5,1,2,4,5,5.5 MHz C : 0.2,0.5,1,1.5,2 MHz	
11:00	PULSE & BAR	
14:00	100% COLOR BARS	400Hz sine wave (25KHz deviation)
16:30		(75KHz deviation)
17:00	50% BOWTIE & 10T	
19:00	LINE 17A SIGNAL	
22:00	QUAD PHASE	No-Signal
24:00	FLAT FIELD	
26:00	100% COLOR BARS with dropout	
28:00	COMPOSITE H, SWEEP with VISC	
30:00		

8-5-1. CCD Clock VCO Adjustment

• Setting

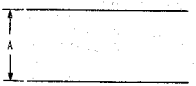
Equipment: Dualscope Oscilloscope	Board: VDA-11P board

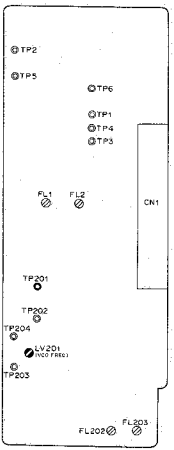
• Preparation

• built-in color-bar
• Insert the BCT-20M and put the unit into the REC mode.

• Adjustment procedures

• Test point : TP201/VDA-11P
• Adj. point : LV201 (VCO FREQ)/VDA-11P
• Spec. : A=2.5±0.05Vdc





VDA-11P BOARD(COMPONENT SIDE)

8-5-2. CCD Clock Bias Adjustment

• Setting

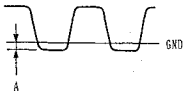
Equipment: Dualscope Oscilloscope	Board: VDA-11P board

• Preparation

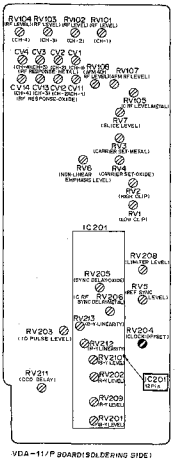
• built-in color-bar
• Insert the BCT-20M and put the unit into the REC mode.

• Adjustment procedures

• Test point : PIN-12 (IC201)/VDA-11P
• Adj. point : RV204 (CLOCK OFFSET)/VDA-11P
• Spec. : A=−0.5±0.1Vdc



TRIG : HD/SG



8-5-3. CCD Output Level Adjustment

• Setting

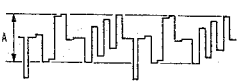
Equipment: Dualtrace Oscilloscope	Board: VDA-11P board

• Preparation

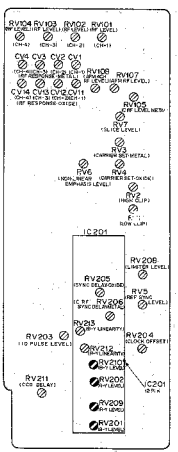
- built-in color-bar
- Insert the BCT-20M and put the unit into the REC mode.

• Adjustment procedures

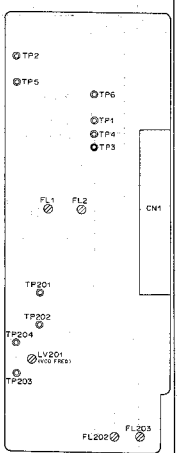
- Test point : TP3/VDA-11P
- Adj. point : B-Y Level
  - RV201 (B-Y LEVEL)/VDA-11P
  - RV209 (B-Y LEVEL)/VDA-11P
  - : R-Y Level
  - RV202 (R-Y LEVEL)/VDA-11P
  - RV210 (R-Y LEVEL)/VDA-11P
- Spec. : A = CCD output level in each channel
  = 0.5 ± 0.01V



TRIG : INT



VDA-11/P BOARD(SOLDERING SIDE)



VDA-11/P BOARD(COMPONENT SIDE)

8-5-4. High Chroma Slice Level Adjustment

• Setting

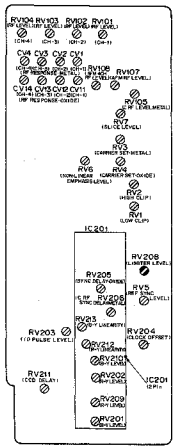
Equipment: Dualtrace Oscilloscope	Board: VDA-11P board

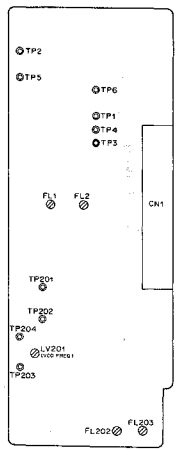
• Preparation

- Input signal: 75% color-bar (chroma: +6 dB)
- Insert the BCT-20M and put the unit into the REC mode.
- If the chroma level of the Signal Generator can not be + 6dB, remove the R-Y, B-Y terminated resistors R3 and R4 on the Video Signal Input Board (EW-573) temporarily and perform the adjustment.

• Adjustment procedures

- Test point : TP3/VDA-11P
- Adj. point : RV208 (LIMITER LEVEL)/VDA-11P
- Spec. : A = 0.442 ± 0.05V





8-5-5. C REF Sync Level Adjustment

• Setting

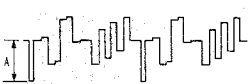
Equipment: Dualtrace Oscilloscope	Board: VDA-11P board

• Preparation

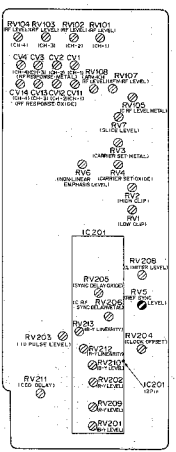
- built-in color-bar
- Insert the BCT-20M and put the unit into the REC mode.

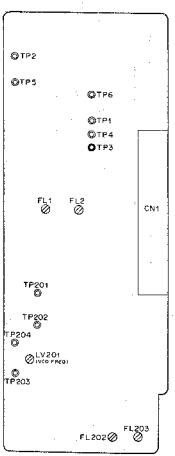
• Adjustment procedures

- Test point : TP3/VDA-11P
- Adj. point : RV5 (REF SYNC LEVEL)/VDA-11P
- Spec. : A = 0.598 ± 0.01V



TRIG : HD/SG





8-5-6. C REF Sync Trapezoid Adjustment

• Setting

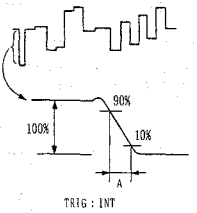
Equipment: Dualtrace Oscilloscope	Board: VDA-11P board

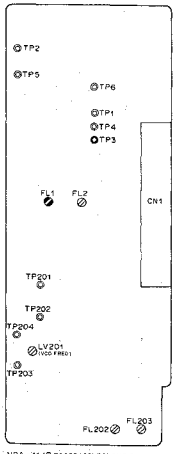
• Preparation

- built-in color-bar
- Insert the BCT-20M and put the unit into the REC mode.
- Extent VDA board using for the set up attenate tool for extension board.

• Adjustment procedures

- Test point : TP3/VDA-11P
- Adj. point : ❷FL1/VDA-11P
- Spec. : A = 220±20nsec





VDA-11/P BOARD (COMPONENT SIDE)

8-5-7. ID Pulse Level Adjustment

• Setting

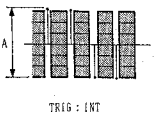
Equipment: Dualtrace Oscilloscope	Board: VDA-11P board

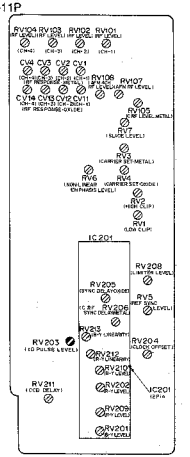
• Preparation

- built-in color-bar
- Insert the BCT-20M and put the unit into the REC mode.
- Extent VDA board using for the setup attenate tool for extension board.

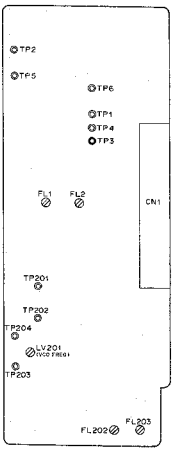
• Adjustment procedures

- Test point : TP3/VDA-11P
- Adj. point : ❷RV203 (ID PULSE LEVEL)/VDA-11P
- Spec. : A=0.5±0.05 V





VDA-11/P BOARD(SOLDERING SIDE)



VDA-11/P BOARD(COMPONENT SIDE)

8-5-8. C Carrier/Deviation Adjustment

1) Adjustment using Spectrum Analyzer

Step.1

• Setting

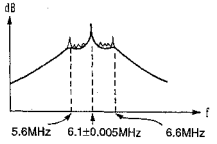
Equipment: Spectrum Analyzer	Board: VDA-11P board

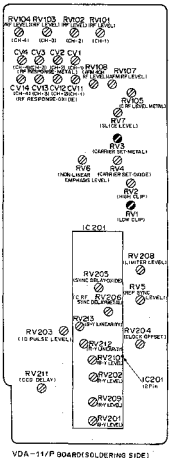
• Preparation

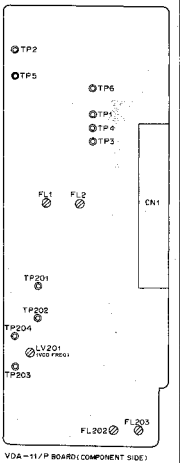
- built-in color-bar
- Insert the BCT-20M and put the unit into the REC mode.
- Extent VDA board using for the setup attenate tool for extension board.

• Adjustment procedures

- Test point : TP5/VDA-11P
- Adj. point : Carrier adjustment
  ●RV3
  (CARRIER SET METAL)/VDA-11 P
  Deviation adjustment
  ●RV1 (IC-2)/VDA-11P
  : Carrier adjustment
- Spec. Set the center peak level to 5.3MHz.
  : Deviation adjustment
  Set the gap between the two peaks (4.8MHz and 5.8MHz) to 1MHz.
  (4.8MHz and 5.8MHz) to 1MHz.







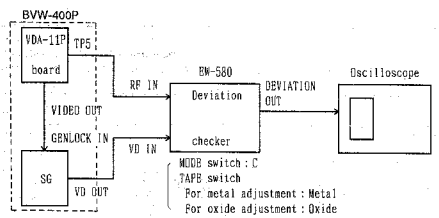
© VTR SYSTEM ADJUSTMENT

2) Adjustment using Deviation Checker

• Setting

Equipment: Dualtrace Oscilloscope	Board: VDA-11P board

• Connection

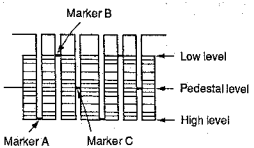


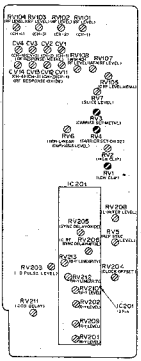
• Preparation

- built-in color-bar
- Insert the BCT-20M and put the unit into the REC mode.
- After metal adjustment is completed, insert the BCT-20K and put the unit into the REC mode.
- Exetent VDA board using for the setup attenate tool for extension board.

• Adjustment procedures

- Test point : DEVIATION OUT (DEVIATION CHECKER)
- Adj. point : • METAL
  Marker C adjustment (Carrier setting)
  ●RV3/VDA-11P
  Marker A and B adjustment (deviation)
  ●RV1 (IC2)/VDA-11P
  • OXIDE
  Marker C Adjustment (Carrier setting)
  ●RV4/VDA-11P
- Spec. : Procedure
  1. Set marker C to the pedestal level.
  2. Set marker A to the high level and marker B to the low level.
  3. Set oxide marker C to the pedestal level.





8. VTR SYSTEM ALIGNMENT

Step 2

• Setting

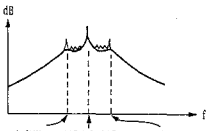
Equipment: Spectrum Analyzer	Board: VDA-11P board

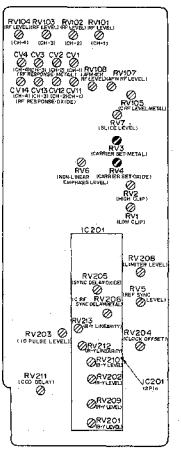
• Preparation

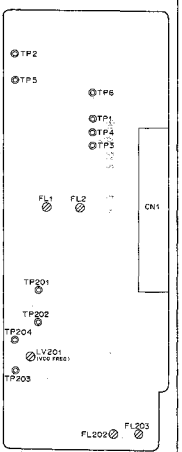
- built-in color-bar
- Insert the BCT-20K and put the unit into the REC mode.
- Extent VDA board using for the setup attenate tool for extension board.

• Adjustment procedures

- Test point : TP5/VDA-11P
- Adj. point : Carrier adjustment
  ●RV4
  (CARRIER SET OXIDE)
  /VDA-11P
- Spec. : Carrier adjustment
  Set the center peak level to 4.5MHz.







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8-5-9. C Low Clip Adjustment

• Setting

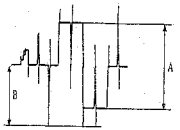
Equipment: Dualtrace Oscilloscope	Board: VDA-11P board

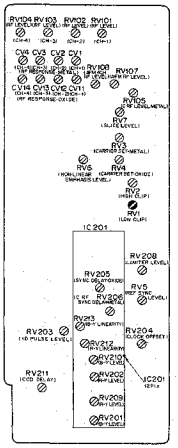
• Preparation

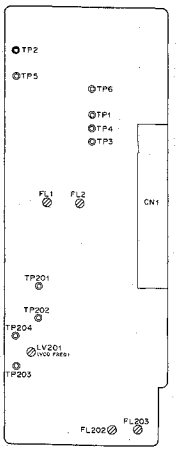
- Input signal: pulse & bar (3T, 2T)
- Insert the BCT-20K and put the unit into the REC mode.
- Exetent VDA board using for the setup attenate tool for extension board.

• Adjustment procedures

- Test point : TP2/VDA-11P
- Adj. point : ⊘RV1 (LOW CLIP) /VDA-11P
- Spec. : A = R-Y/B-Y level B = A × 130±5%







8-5-10. C High Clip Adjustment

• Setting

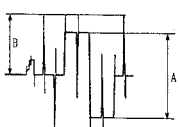
Equipment: Dualtrace Oscilloscope	Board: VDA-11P board

• Preparation

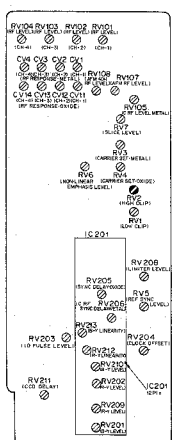
- Input signal: pulse & bar (3T, 2T)
- Insert the BCT-20M and put the unit into the REC mode.
- After level A is measured, set the chroma level to +6dB and adjust level B.
- Exetent VDA board using for the setup attenate tool for extension board.

• Adjustment procedures

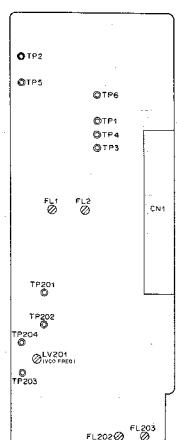
- Test point : TP2/VDA-11P
- Adj. point : ◐RV2 (HIGH CLIP) /VDA-11P
- Spec. : A= R-Y/B-Y level B= A × 285±5%



TRIG : HD/SG



VDA-11/P BOARD(SOLDERING SIDE)



VDA-11/P BOARD(COMPONENT SIDE)

• Note

- If the chroma level of the signal generator can not be +6dB, remove the R-Y, B-Y terminated resistors R3 and R4 on the Video Signal Input Board (EW-573) temporarily and perform the adjustment.

8-5-11. C Nonlinear Emphasis Level Adjustment

• Setting

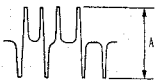
Equipment: Dualtrace Oscilloscope	Board: VDA-11P board

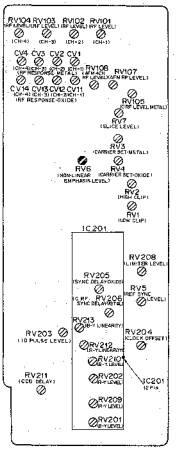
• Preparation

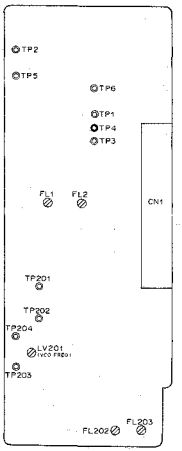
- Input signal: pulse & bar (3T, 2T)
- Insert the BCT-20M and put the unit into the REC mode.
- Exetent VDA board using for the setup attenate tool for extension board.

• Adjustment procedures

- Test point : TP4/VDA-11P
- Adj. point : RV6 (NON-LINEAR EMPHASIS LEVEL)/VDA-11P
- Spec. : A= 60 ± 2mV







8-5-12. C REC HF Adjustment

• Setting

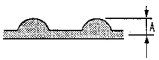
Equipment: Dualtrace Oscilloscope	Board: VDA-11P board

• Preparation

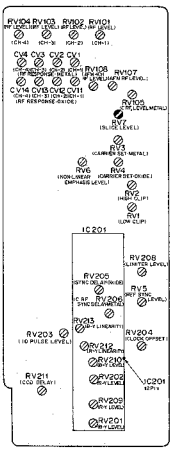
- Y, B-Y input signal: 0% flat field
- R-Y input signal: H sweep (For only RF, 1Vp-p/75ohms) TP-39/Extention board.
- Insert the BCT-20M and put the unit into the REC mode.
- Exetent VDA board using for the setup attenate tool for extension board.

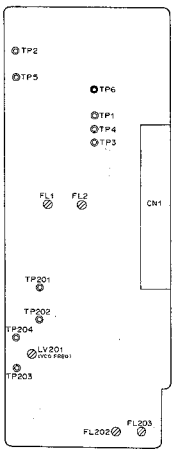
• Adjustment procedures

- Test point : TP6/VDA-11P
- Adj. point : ●RV7 (SLICE LEVEL)/VDA-11P
- Spec. : A=60±2mVp-p
  (Measured at hte waveform center.)



TRIG : HD/SG





8-5-13. C MODE Carrier Balance Adjustment

• Setting

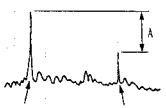
Equipment: Spectrum Analyzer	Board: VDA-11P board

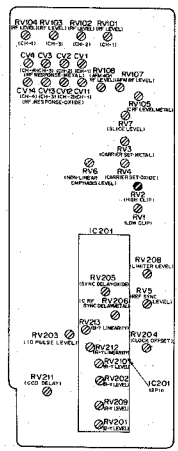
• Preparation

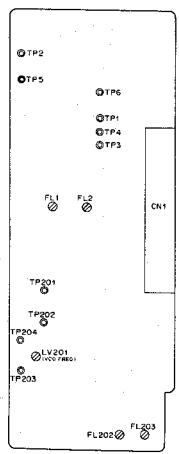
- Input signal: 0% flat field
- Insert the BCT-20M and put the unit into the REC mode.

• Adjustment procedures

- Test point : TP5/VDA-11P
- Adj. point : RV2 (IC2)/VDA-11P
- Spec. : Minimize the level at 10.6MHz. (A=40dB or more)







8. VTR SYSTEM ALIGNMENT

8-5-14. Y Input Level Adjustment

• Setting

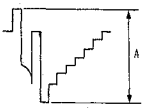
Equipment: Dualtrace Oscilloscope	Board: AFM-6P board

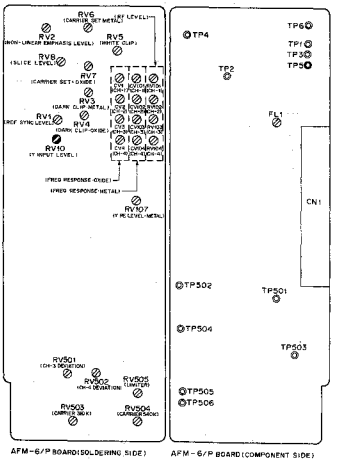
• Preparation

- built-in color-bar
- Insert the BCT-20M and put the unit into the REC mode.

• Adjustment procedures

- Test point : TP5/AFM-6P
- Adj. point : ❷RV10 (Y LEVEL)/AFM-6P
- Spec. : A=1.0±0.02V





8-5-15. Y REF Sync Level Adjustment

• Setting

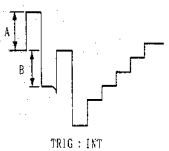
Equipment: Dualtrace Oscilloscope	Board: AFM-6P board

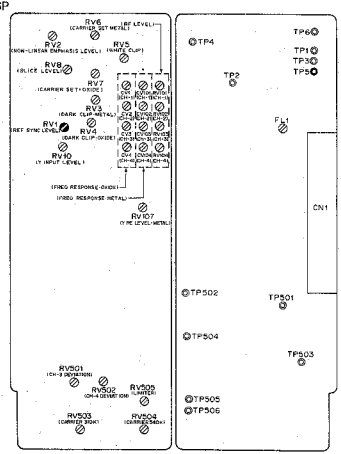
• Preparation

• built-in color-bar
• Insert the BCT-20M and put the unit into the REC mode.

• Adjustment procedures

• Test point : TP5/AFM-6P
• Adj. point : ❷RV1 (REF SYNC LEVEL)/AFM-6P
• Spec. : A:B=100:125±2.5%





8-5-16. Y REF Sync Slant Adjustment

• Setting

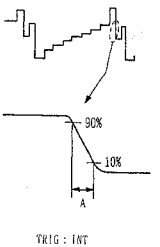
Equipment: Dualtrace Oscilloscope	Board: AFM-6P board

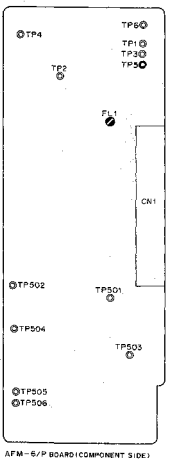
• Preparation

- Built-in-color-bar
- Insert the BCT-20M and put the unit into the REC mode.

• Adjustment procedures

- Test point : TP5/AFM-6P
- Adj. point : ⊘FL1/AFM-6P
- Spec. : A=180±20nsec





8-5-17. Y Carrier/Deviation Adjustment

1) Adjustment using Spectrum Analyzer

Step 1

• Setting

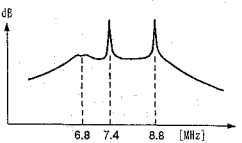
Equipment: Spectrum Analyzer	Board: AFM-6P board

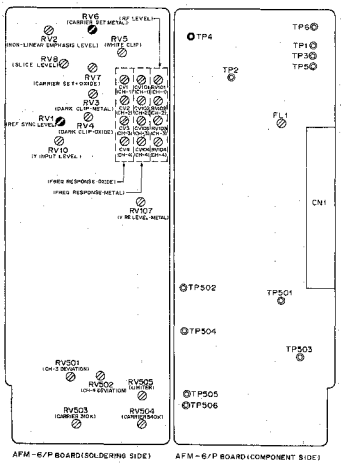
• Preparation

- Input signal: 100% flat field
- Insert the BCT-20M and put the unit into the REC mode.

• Adjustment procedures

- Test point : TP4/AFM-6P
- Adj. point : Sync tip carrier adjustment
  ✔RV6 (CARRIER SET METAL)/ AFM-6P
  : Deviation adjustment
  ✔RV1/AFM-6P
- Spec. : Sync tip carrier adjustment
  Set the left side peak level to 5.7MHz.
  : Deviation adjustment
  Set the gap between two peaks to 1.4MHz.





Step 2

• Setting

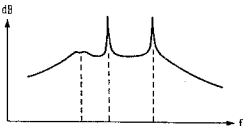
Equipment: Spectrum Analyzer	Board: AFM-6P board

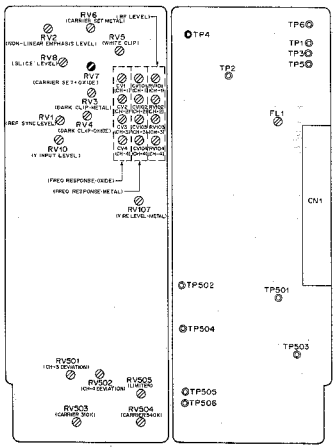
• Preparation

• Input signal: 100% flat field
• Insert the BCT-20K and put the unit into the REC mode.

• Adjustment procedures

• Test point : TP4/AFM-6P
• Adj. point : Sync tip carrier adjustment
✪ RV7 (CARRIER SET OXIDE)/AFM-6P
• Spec. : Sync tip carrier adjustment
Set the left side peak level to 4.4 MHz.





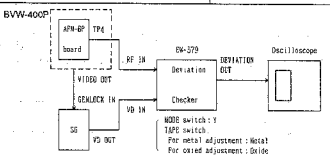
2) Adjustment Using Deviation Checker

• Setting

Equipment: Dualtrace Oscilloscope	Board: AFM-6P board

• Connection

BVW-400

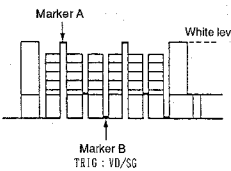


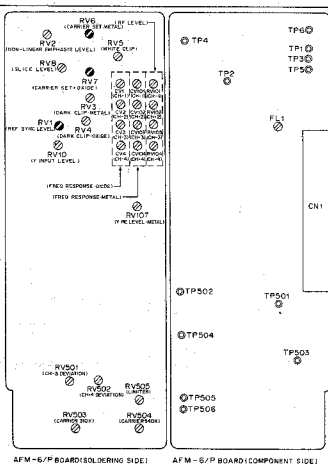
• Preparation

- Built-in color-bar
- Insert the BCT-20M and put the unit into the REC mode.
- After metal adjustment is completed, insert the BCT-20K and put the unit into the REC mode.

• Adjustment procedures

- Test point : DEVIATION OUT (DEVIATION CHECKER)
- Adj. point : METAL
  Marker B adjustment (CARRIER SETTING)
  ◆ RV6 /AFM-6P
  Marker A adjustment (DEVIATION)
  ◆ RV1/AFM-6P
  : OXIDE
  Marker B adjustment (CARRIER SETTING)
  ◆ RV7 /AFM-6P
- Spec. : Procedure
  1. Set marker B to the sync tip level.
  2. Set marker A to the white peak level.
  3. Set oxide marker B to the sync tip level.





8-5-18. Y Dark Clip Adjustment

• Setting

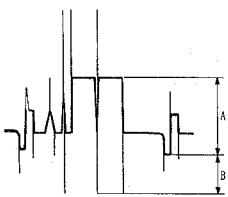
Equipment: Dualtrace Oscilloscope	Board: AFM-6P board

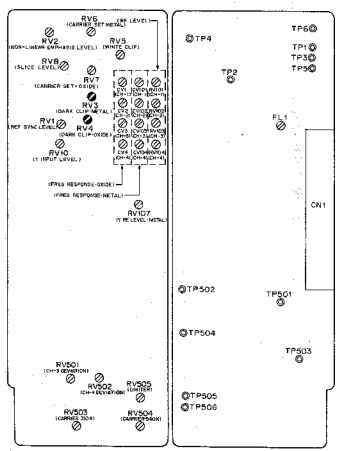
• Preparation

• Input signal: MOD pulse & bar
• Metal: Insert the BCT-20M and put the unit into the REC mode.
• Oxide: Insert the BCT-20K and put the unit into the REC mode.

• Adjustment procedures

• Test point : TP2/AFM-6P
• Adj. point : ✔ RV3 (DARK CLIP METAL) /AFM-6P
✔ RV4 (DARK CLIP OXIDE) /AFM-6P
• Spec. : B = A × 150 ± 2.5% (METAL)
B = A × 65 ± 2.5% (OXIDE)





8-5-19. Y White Clip Adjustment

• Setting

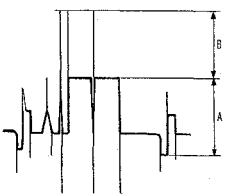
Equipment: Dualtrace Oscilloscope	Board: AFM–6P board

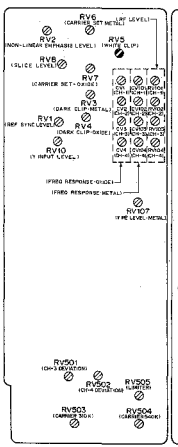
• Preparation

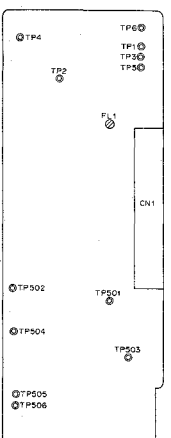
• Input signal: MOD pulse and bar
• Insert the BCT-20M and put the unit into the REC mode.

• Adjustment procedures

• Test point : TP2/AFM-6P
• Adj. point : ⊘ RV5 (WHITE CLIP) /AFM-6P
• Spec. : A = VS level
B = A × 130 ± 2.5%







8-5-20. Y Nonlinear Emphasis Level Adjustment

• Setting

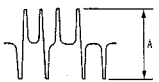
Equipment: Dualtrace Oscilloscope	Board: AFM–6P board

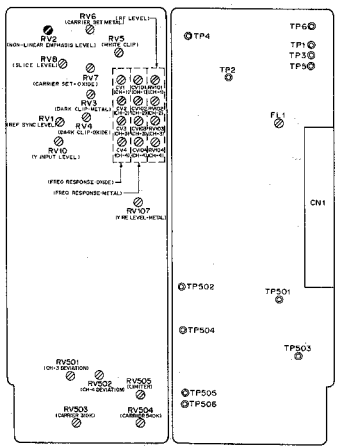
• Preparation

- Input signal: MOD pulse and bar
- Insert the BCT-20M and put the unit into the REC mode.

• Adjustment procedures

- Test point : TP3/AFM-6P
- Adj. point : ✪ RV2 (NON-LINEAR EMPHASIS)/AFM-6P
- Spec. : A = 90 ± 2mV





8-5-21. Y REC HF Adjustment

• Setting

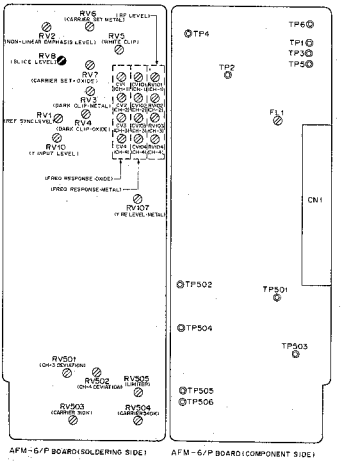
Equipment: Dualtrace Oscilloscope	Board: AFM-6P board

• Preparation

• Y input signal: H sweep (Sweep signal 115IRE and sync signal 40IRE/75-ohms termination)
TP9/Extension board: AFM-6P
• Insert the BCT-20M and put the unit into the REC mode.

• Adjustment procedures

• Test point : TP6/AFM-6P
• Adj. point : RV8 (SLICE LEVEL)/AFM-6P
• Spec. : A = 150 ± 5mV
(Measured at the waveform center.)



8-5-21 Y REC ADJUSTMENT

8-5-22. Y MOD Carrier Balance Adjustment

• Setting

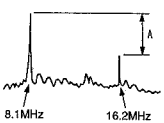
Equipment: Spectrum Analyzer	Board: AFM-6P board

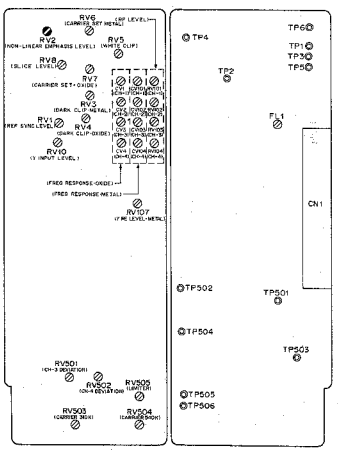
• Preparation

• Input signal: 50% flat field
• Insert the BCT-20M and put the unit into the REC mode.

• Adjustment procedures

• Test point : TP4/AFM-6P
• Adj. point : ⊘ RV2 (IC1)/AFM-6P
• Spec. : Minimize the level at 14MHz.
(A = 40dB or more)





8-5-23. Y REC Current Tentative Adjustment (Oxide)

• Setting

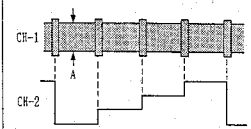
Equipment: Dualtrace Oscilloscope	Board: AFM–6P board

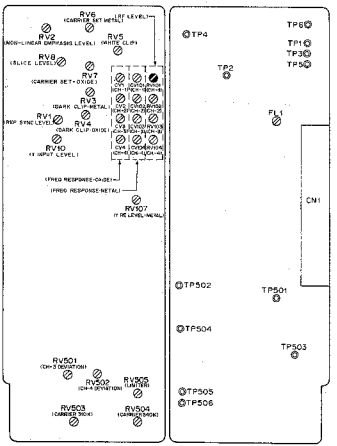
• Preparation

- Input signal: 50% flat field
- Insert the BCT-20K and put the unit into the REC mode.

• Adjustment procedures

- Test point : CH1: TP32/Extension board
  CH2: TP7/Extension board
- Adj. point : ⊘ RV101 (CH-1 RF LEVEL) /AFM-6P
- Spec. : A = 800 ± 20mV



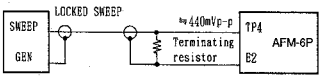


8-5-24. Y REC Current Frequency Response Adjustment (Oxide)

• Setting

Equipment: Dualtrace Oscilloscope	Board: AFM-6P board

• Connection



• Preparation

- Remove short-housing CNJ2 on the AFM-6P board, connect the Sweep Signal Generator between TP4 on the AFM-6P board and E2 on the AFM-6P board and supply a locked sweep signal.
- Insert the BCT-20K and put the unit into the REC PAUSE mode.
- After adjustment is completed, install short-housing CNJ2.

• Adjustment procedures

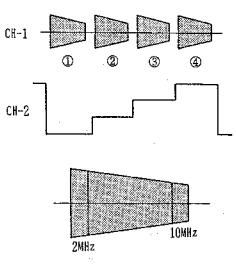
• Test point : CH-1 : TP32/Extension board
CH-2 : TP7/Extension board

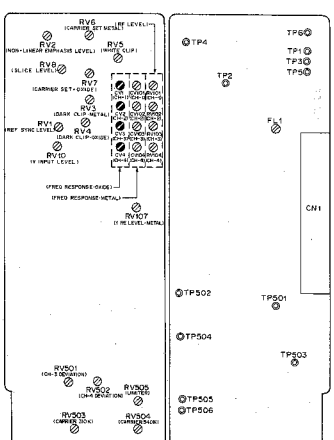
• Adj. point : ① : CV1/AFM-6P
② : CV2/AFM-6P
③ : CV3/AFM-6P
④ : CV4/AFM-6P

• Spec.

frequency	level
2 MHz	100% reference
10 MHz	90 $^{+5}_{-15}$ %

TRIG: TP7/Extension board





8-5-25. Y REC Current Adjustment (Oxide)

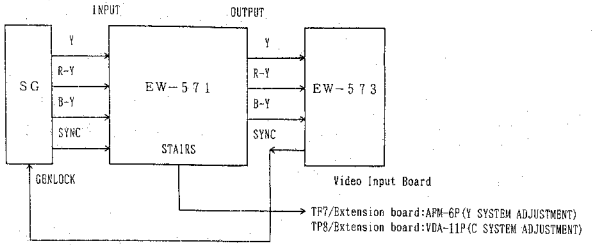
Step 1.

• Setting

Equipment: Dualtrace Oscilloscope	Board: AFM-6P board

• Connection

REC CURRENT ADJ. TOOL

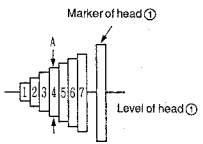


• Preparation

- Remove short-housing CNJ2 on the AFM-6P board and connect the RF OUT connector of the REC Current Adjustment Tool between TP4 on the AFM-6P board and E2 on the AFM-6P board.
- Insert the BCT-20K and put the unit into the REC PAUSE mode.
- Adjustment Tool:
  AUTO/MANU → AUTO
  NTSC/PAL → NTSC
  Y/C → Y
  METAL/OXIDE→OXIDE

• Adjustment procedures

- Test point : TP32/Extension board: AFM-6P
- Adj. point : RF LEVEL VR/REC CURRENT ADJUSTMENT TOOL
- Spec. : A = 800 ± 10mV (Fourth level)



Step 2.

• Setting

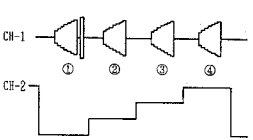
Equipment: Dualtrace Oscilloscope	Board: AFM–6P board

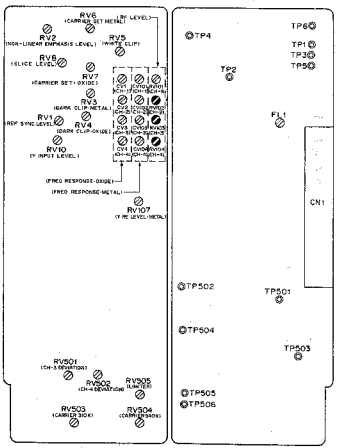
• Preparation

• Adjust so that the specified level is the same as in Step 1.
• Put the unit into the REC mode and record the signal on the tape.

• Adjustment procedures

• Test point : CH-1 : TP32/Extension board
CH-2 : TP7/Extension board
• Adj. point : HEAD② : ✔ RV102/AFM-6P
HEAD③ : ✔ RV103/AFM-6P
HEAD④ : ✔ RV104/AFM-6P
• Spec. :





Step 9

• Setting

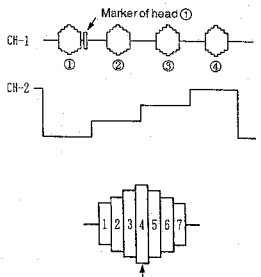
Equipment: Dualtrace Oscilloscope	Board: AFM-6P board

• Preparation

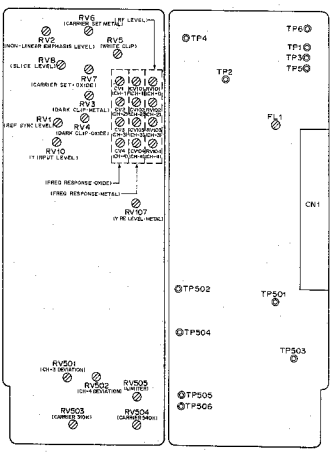
- Play back the recorded portion in step 2.
- Memorize the maximum level for every four heads (① through ④).

• Adjustment procedures

- Test point : CH-1 : TP33/Extension board : VP-24
  CH-2 : TP25/Extension board : VP-24
- Spec: :



Check the maximum PB RF level.
* The illustrated fourth level is maximum.



• Note

- Remove a tool between TP4 and E2 and install short-housing CNJ2.

8. VHS SYSTEM ALIGNMENT

Step 4.

• Setting

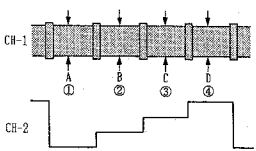
Equipment: Dualtrace Oscilloscope	Board: AFM-6P board

• Preparation

• Input signal: 50% flat field
• Insert the BCT-20K and put the unit into the REC mode.

• Adjustment procedures

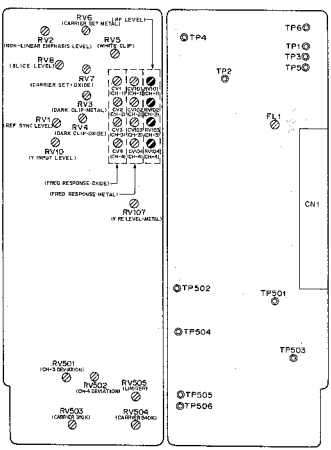
• Test point : CH-1 : TP32/Extension board
CH-2 : TP7/Extension board
• Adj. point : HEAD① : ⊘ RV101/AFM-6P
HEAD② : ⊘ RV102/AFM-6P
HEAD③ : ⊘ RV103/AFM-6P
HEAD④ : ⊘ RV104/AFM-6P
• Spec. : Adjust the voltage so that A, B, C, and D correspond to the maximum levels memorized in Step 3.



[Correspondence Table]

1	2	3	4	5	6	7
630	690	750	800	865	930	980

(mVp-p)

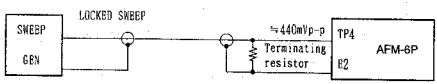


8-5-26. Y REC Current Frequency Response Adjustment (Metal)

• Setting

Equipment: Dualtrace Oscilloscope	Board: AFM-6P board

• Connection



• Preparation

- Remove short-housing CNJ2 on the AFM-6P board, connect the Sweep Signal Generator between TP4 on the AFM-6P board and E2 on the AFM-6 board, and supply a locked sweep signal.
- Insert the BCT-20M and put the unit into the REC mode.
- After adjustment is completed, install short-housing CNJ2.

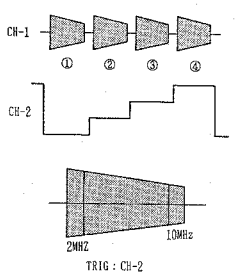
• Adjustment procedures

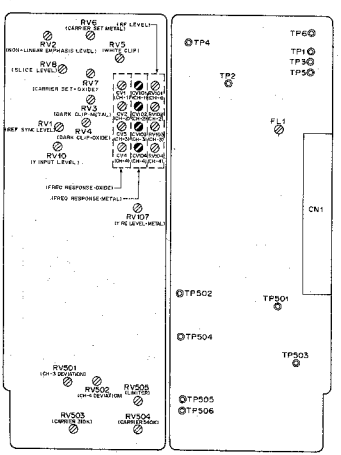
• Test point : CH-1 : TP32/Extension board
CH-2 : TP7/Extension board

• Adj. point : ① ✿CV101/AFM-6P
② ✿CV102/AFM-6P
③ ✿CV103/AFM-6P
④ ✿CV104/AFM-6P

• Spec. :

frequency	level
2 MHz	100% reference
10 MHz	95^{+5}_{-10} %





8-5-27. Y REC Current Adjustment (Metal)

• Setting

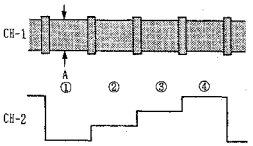
Equipment: Dualtrace Oscilloscope	Board: AFM-6P board

• Preparation

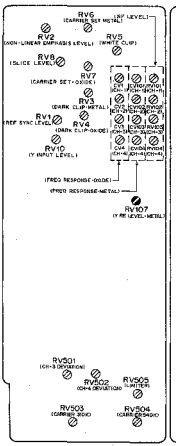
- Input signal: 50% flat field
- Insert the BCT-20M and put the unit into the REC mode.

• Adjustment procedures

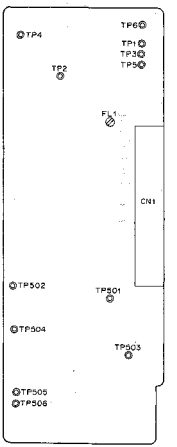
- Test point : CH-1 : TP32/Extension board
  CH-2 : TP7/Extension board
- Adj. point : ✪ RV107/AFM-6P
- Spec. : Adjust so that A is two times as high as the level of head ① which is set in Step 4 of Sec. 8-5-25. Y REC Current Adjustment (Oxide).



The each level of the head ① through ④ should be less than 1.6V.



AFM-6/P BOARD (SOLDERING SIDE)



AFM-6/P BOARD (COMPONENT SIDE)

8-5-28. C REC Current Tentative Adjustment (Oxide)

• Setting

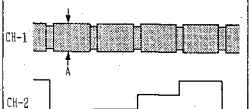
Equipment: Dualtrace Oscilloscope	Board: VDA–11P board

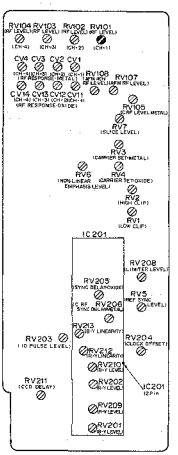
• Preparation

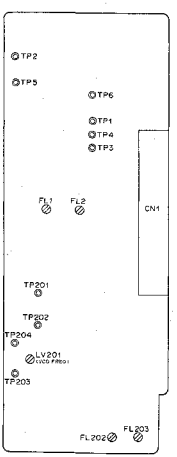
• Input signal: 0% flat field
• Insert the BCT-20K and put the unit into the REC mode.

• Adjustment procedures

• Test point : CH-1 : TP46/Extension board
CH-2 : TP8/Extension board
• Adj. point : RV101 (CH-1 RF LEVEL)
/VDA-11P
• Spec. : A = 400±10mV







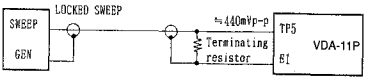
8. VTR SYSTEM ALIGNMENT

8-5-29. C REC Current Frequency Response Adjustment (Oxide)

• Setting

Equipment: Dualtrace Oscilloscope	Board: VDA-11P board

• Connection



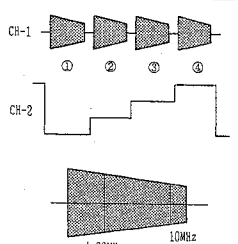
• Preparation

- Remove short-housing CNJ2 on the VDA-11P board, connect the Sweep Signal Generator between TP5 on the VDA-11P board and E1 on the VDA-11P board, and supply a locked sweep signal.
- Insert the BCT-20K and put the unit into the REC PAUSE mode.

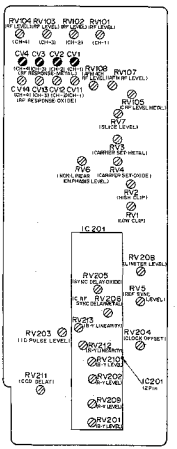
• Adjustment procedures

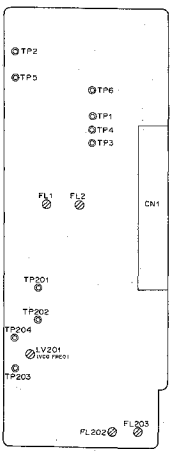
- Test point : CH-1 : TP46/Extension board
  CH-2 : TP8/Extension board
- Adj. point : CH-1 : ● CV1/VDA-11P
  CH-2 : ● CV2/VDA-11P
  CH-3 : ● CV3/VDA-11P
  CH-4 : ● CV4/VDA-11P
- Spec. :

frequency	level
3.93 MHz	100% reference
10 MHz	60 ±10%



TRIG : TP8/Extension board





• Note

- After adjustment is completed, install short-housing CNJ2.

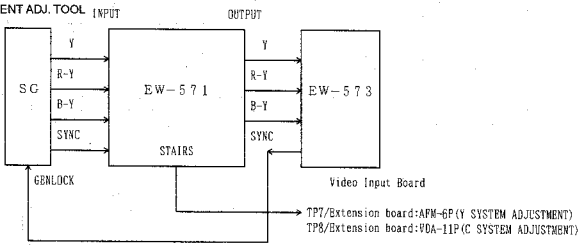
8-5-30. C REC Current Adjustment (Oxide)

Step 1.

• Setting

Equipment: Dualtrace Oscilloscope	Board: VDA–11P board

• Connection

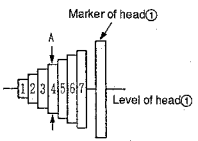


• Preparation

- Remove short-housing CNJ2 on the VDA-11P board and connect the RF OUT connector of the REC Current Adjustment Tool between TP5 on the VDA-11P board and E1 on the VDA-11P board.
- Insert the BCT-20K and put the unit into the REC PAUSE mode.
- Adjustment:
  AUTO/MANU→AUTO
  NTSC/PAL→NTSC
  Y/C→C
  METAL/OXIDE→OXIDE

• Adjustment procedures

- Test point : TP46/Extension board
- Adj. point : RF LEVEL VR/REC Current Adjustment Tool
- Spec. : A = 400±10mV (Fourth level)



Step 2.

• Setting

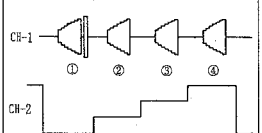
Equipment: Dualtrace Oscilloscope	Board: VDA-11P board

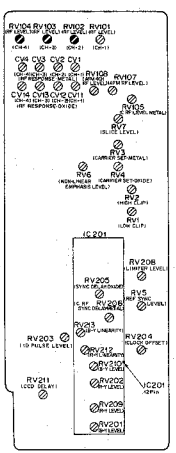
• Preparation

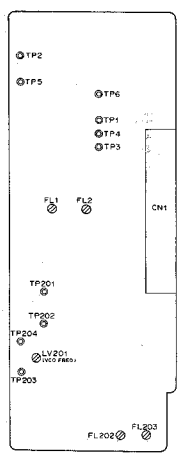
• Adjust so that the specified level is the same as in Step 1.
• Put the unit into the REC mode and record the signal in the tape.

• Adjustment procedures

• Test point : CH-1 : TP46/Extension board
CH-2 : TP8/Extension board
• Adj. point : HEAD② : ● RV102/VDA-11P
HEAD③ : ● RV103/VDA-11P
HEAD④ : ● RV104/VDA-11P







Step 3.

• Setting

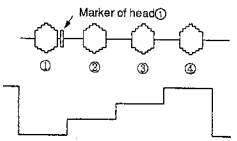
Equipment: Dualtrace Oscilloscope	Board: VP-24P board

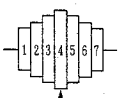
• Preparation

• Play back the recorded portion in Step 2.
• Memorize the maximum level for every four heads (① through ④)

• Adjustment procedures

• Test point : CH-1 : TP31/Extension board: VP-24P
CH-2 : TP25/Extension board: VP-24P
• Spec. :





Check the maximum PB RF level.
* The illustrated fourth level is maximum.

• Note

• Remove the tool between TP5 and E1 and install short-housing CNJ2.

Step 4.

• Setting

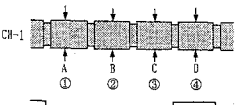
Equipment: Dualtrace Oscilloscope	Board: VDA-11P board

• Preparation

• Input signal: 0% flat field
• Insert the BCT-20K and put the unit into the REC mode.

• Adjustment procedures

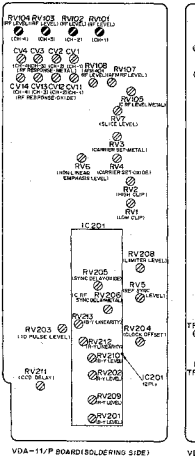
• Test point : CH-1 : TP46/Extension board
CH-2 : TP8/Extension board
• Adj. point : HEAD① : ✿ RV101/VDA-11P
HEAD② : ✿ RV102/VDA-11P
HEAD③ : ✿ RV103/VDA-11P
HEAD④ : ✿ RV104/VDA-11P
• Spec. : Adjust the voltage so that A,B, C, and D correspond to the maximum levels memorized in Step 3.

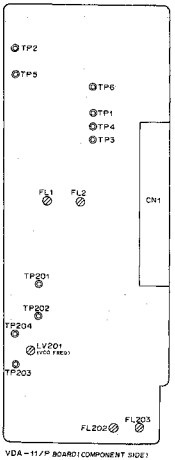


[Correspondence Table]

1	2	3	4	5	6	7
310	340	370	400	430	475	500

(mVp-p)



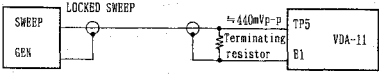


8-5-31. C REC Current Frequency Response Adjustment (Metal)

• Setting

Equipment: Dualtrace Oscilloscope	Board: VDA-11P board

• Connection

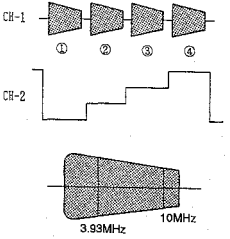


• Preparation

- Remove short-housing CNJ2 on the VDA-11P board, connect the Sweep Signal Generator between TP5 on the VDA-11P board and E1 on the VDA-11P board, and supply a locked sweep signal.
- Insert the BCT-20M and put the, unit into the REC mode.

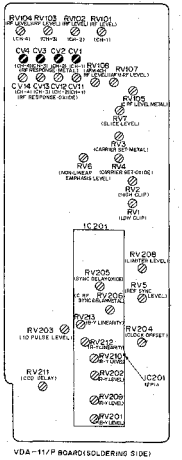
• Adjustment procedures

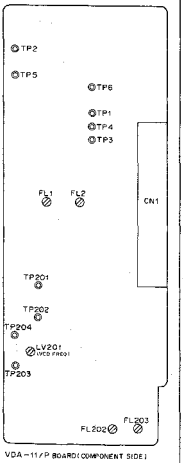
- Test point : CH-1 : TP46/Extension board
  CH-2 : TP8/Extension board
- Adj. point : ① : CV1/VDA-11P
  ② : CV2/VDA-11P
  ③ : CV3/VDA-11P
  ④ : CV4/VDA-11P
- Spec. :



frequency	level
3.93 MHz	100% reference
10 MHz	65 ±10%

TRIG : CH-2





• Note

- After adjustment is completed, install short-housing CNJ2.

8-5-32. C REC Current Adjustment (Metal)

• Setting

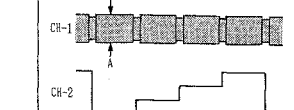
Equipment: Dualtrace Oscilloscope	Board: VDA-11P board

• Preparation

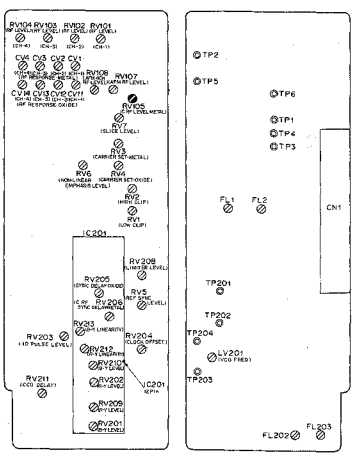
- Input signal: 0% flat field
- Connect a tantalum capacitor (1 to 10μF/16V) between TP35 and TP1, TP36 and TP2 on the Extension board. (TP1 and TP2 negative).
- Insert the BCT-20M and put the unit into the REC mode.

• Adjustment procedures

- Test point : CH-1 : TP46/Extension board
  CH-2 : TP8/Extension board
- Adj. point : ⊘ RV105/VDA-11P
- Spec. : Adjust so that A is one point eight times as high as the level of head ① which is set in Step 4 of Sec. 8-5-30 C REC Current Adjustment (Oxide).



Note: The each level of the head ① through ④ should be less than 1.0V.



8-5-33. C REF Sync Position Tentative Adjustment (Metal)

• Setting

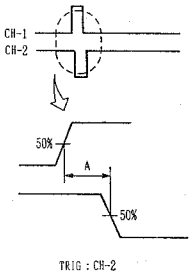
Equipment: Dualtrace Oscilloscope	Board: VDA-11P board

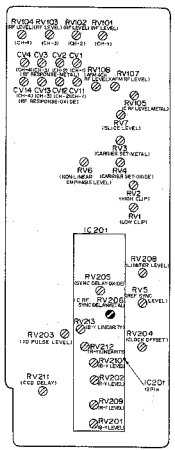
• Preparation

- Input signal: MOD pulse and bar
- Insert the BCT-20M and put the unit into the REC mode.

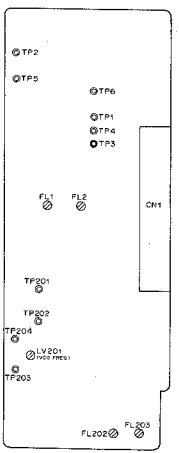
• Adjustment procedures

- Test point : CH-1 : TP17/Extension board
  CH-2 : TP3/VDA-11P
- Adj. point : ⊘ RV206 (C REF SYNC DELAY METAL)/VDA-11P
- Spec. : A = 195±5nseC





VDA-11/P BOARD(SOLDERING SIDE)



VDA-11/P BOARD(COMPONENT SIDE)

8-5-34. C REF Sync Position Tentative Adjustment (Oxide)

• Setting

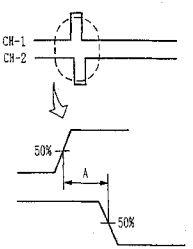
Equipment: Dualtrace Oscilloscope	Board: VDA-11P board

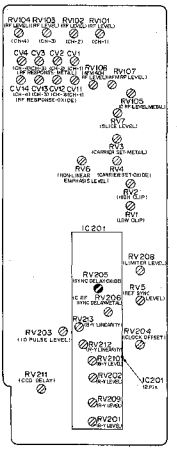
• Preparation

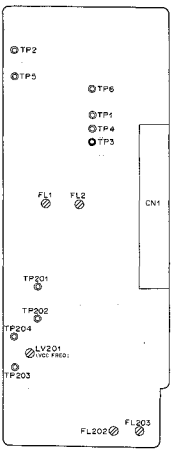
• Input signal: MOD pulse and bar
• Insert the BCT-20K and put the unit into the REC mode.

• Adjustment procedures

• Test point : CH-1 : TP17/Extension board
CH-2 : TP3/VDA-11P
• Adj. point : RV2 05/VDA-11P (C REF SYNC DELAY OXIDE)
• Spec. : A = 185 ± 5nsec







8-5-35. Composite Y/C Delay Adjustment (Metal)

Step 1.

• Note

• A standard VTR (BVW-75 or the equivalent) which is adjusted to the specified value is used in this adjustment.

• Setting

Equipment: Dualtrace Oscilloscope	Board: VDA-11P board

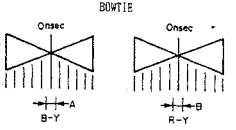
• Preparation

• Input signal: BOWTIE (TSG-300) • Insert the BCT-20M and put the unit into the REC mode. • Play back the recorded tape using a standard VTR player. • Set the Y/C DELAY control of a standard VTR player to PRESET.

• Adjustment procedures

• Test point : CAV Y, CAV R–Y, CAV B–Y } OUT/Standard VTR (terminated by 75 ohms)

• Spec. : A , B ≈ ±10nsec



1. Check that the cross point of waveform is between A and B.
2. If the specification is not satisfied, check that the chroma signal is advanced or delayed.

Step 2.

• Setting

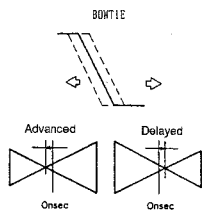
Equipment: Dualtrace Oscilloscope	Board: VDA-11P board

• Preparation

• Insert the BCT-20M and put the unit into the REC mode.

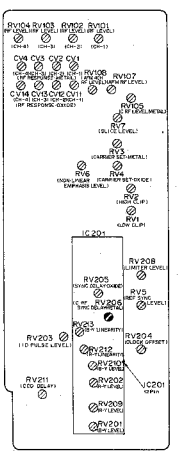
• Adjustment procedures

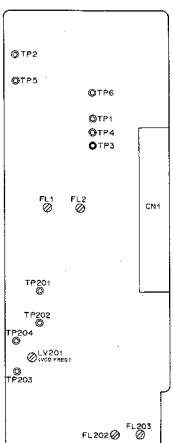
• Test point : TP3/VDA-11P
• Adj. point : RV206 /VDA-11P (C REF SYNC DELAY METAL)
• Spec. :



TRIG:TP17/Extension board

1. When the chroma signal is delayed, correct the REF Sync signal in the right direction.
2. When the chroma signal is advanced, correct the REF Sync signal in the left direction.
3. Adjust Steps 1 and 2 repeatedly until the specification is satisfied.





8-5-36. Composite Y/C Delay Adjustment (Oxide)

Step 1.

• Setting

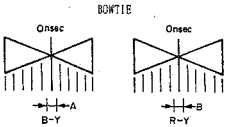
Equipment: Dualtrace Oscilloscope	Board: VDA-11P board

• Preparation

- Input signal: MOD pulse and bar
- Insert the BCT-20K and put the unit into the REC mode.
- Play back the recorded tape using a standard VTR.
- Set the Y/C DELAY control of a standard VTR to PRESET.

• Adjustment procedures

- Test point : CAV Y, CAV R–Y, CAV B–Y } OUT/Standard VTR (terminated by 75 ohms)
- Spec. : A , B = ±10nsec



1. Check that the cross point of waveform is between A and B.
2. If the specification is not satisfied, check that the chroma signal is advanced or delayed.

• Note

- A standard VTR (BVW-75 or the equivalent) which is adjusted to the specified value is used in this adjustment.

Step 2

• Setting

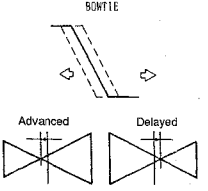
Equipment: Dualtrace Oscilloscope	Board: VDA-11P board

• Preparation

• Insert the BCT-20K and put the unit into the REC mode.

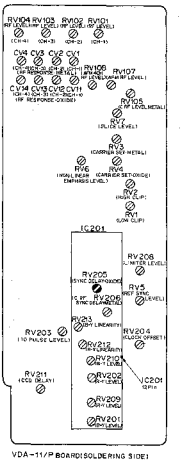
• Adjustment procedures

• Test point : TP3/VDA-11P
• Adj. point : ◐ RV205 /VDA-11(C REF SYNC DELAY OXIDE)
• Spec. :

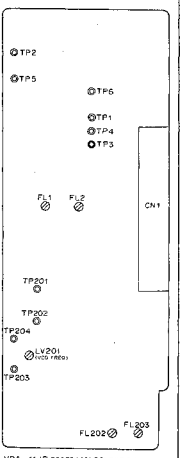


TRIG:TP17/Extension board

1. When the chroma signal is delayed, correct the REF Sync signal in the right direction.
2. When the chroma signal is advanced, correct the REF Sync signal in the left direction.
3. Adjust Steps 1 and 2 repeatedly until the specification is satisfied.



VDA-11/P BOARD(SOLDERING SIDE)



VDA-11/P BOARD(COMPONENT SIDE)

D. VTR SYSTEM ADJUSTMENT

8-5-37. AFM-RF Balance Adjustment

• Setting

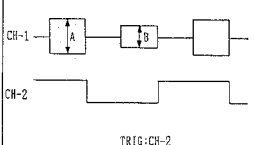
Equipment: Dualtrace Oscilloscope	Board: VDA-11P board

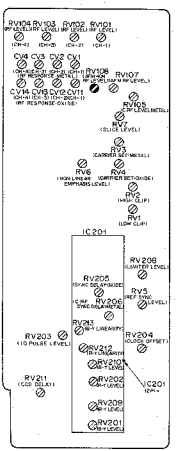
• Preparation

- AUDIO IN CH-1/CH-2: No signal
- Insert the BCT-20M and put the unit into the REC mode.
- Play back the recorded tape using a standard VTR player (BVW-75 or the equivalent).
- REC mode→adjustment
- Play mode→check
- Player CAP Lock Mode "4 FIELD"

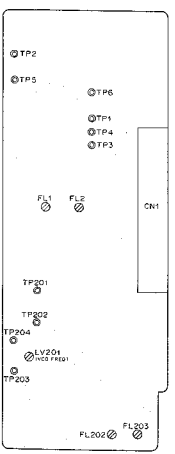
• Adjustment procedures

- Test point : CH-1 : IC602-14/VO-18 board: BVW-75 series
  CH-2 : TP31/EN-48 board: BVW-75 series
- Adj. point : ✪ RV108 /VDA-11P
- Spec. : A = B ± 15%





VDA-11/P BOARD(SOLDERING SIDE)



VDA-11/P BOARD(COMPONENT SIDE)

8-5-38. Y PB RF Level Adjustment

• Setting

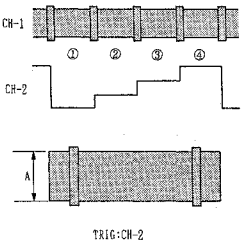
Equipment: Dualtrace Oscilloscope	Board: VP-24P board

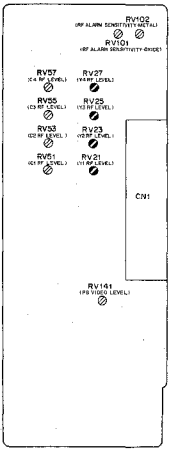
• Preparation

- Play back the flat signal on the alignment tape CR5-2APS.
- Make a tracking so that the RF level is maximum.

• Adjustment procedures

- Test point : CH-1 : TP33/Extension board
  (Terminated by 75 ohms.)
  CH-2 : TP25/Extension board
- Adj. point : ① : RV21/VP-24P
  ② : RV23/VP-24P
  ③ : RV25/VP-24P
  ④ : RV27/VP-24P
- Spec. : A = 220 ± 20mV





VP-24/P BOARD (COMPONENT SIDE)

8-5-39. C PB RF Level Adjustment

• Setting

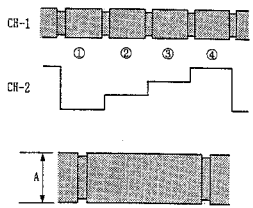
Equipment: Dualtrace Oscilloscope	Board: VP-24P board

• Preparation

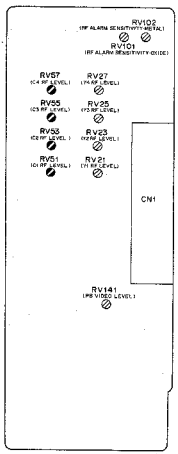
• Play back the flat field signal on the alignment tape CR 5-2APS.
• Make a tracking so that the RF level is maximum.

• Adjustment procedures

• Test point : CH-1 : TP31/Extension board
(Terminated by 75 ohms.)
CH-2 : TP25/Extension board
• Adj. point : ① : RV51/VP-24P
② : RV53/VP-24P
③ : RV55/VP-24P
④ : RV57/VP-24P
• Spec. : A = 220 ± 20mV



TRIG : CH-2



VP-24/P BOARD (COMPONENT SIDE)

8 VTR SYSTEM ALIGNMENT

8-5-40. VF PB Output Level Adjustment

• Setting

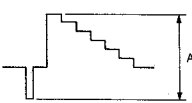
Equipment: Dualtrace Oscilloscope	Board: VP-24P board

• Adjustment procedures

• Test point : TP38/Extension board
• Adj. point : Step 1.
RV141 (PB VIDEO LEVEL) / VP-24P
• Spec. : A = 1.0 ± 0.1V
B = 0.66 ± 0.1V

Step 1.

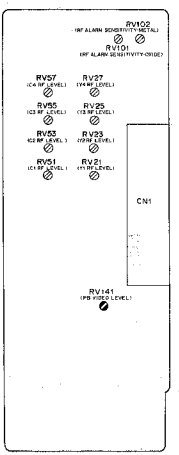
• Play back the color-bar signal on the alignment tape CR5-2APS.



Step 2.

• Press the CTDM button.

Check that level A is 0.5±0.1V



VP-24/P BOARD (COMPONENT SIDE)

8-5-41. RF Alarm Sensitivity Adjustment

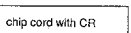
• Setting

Equipment: Dualtrace Oscilloscope	Board: VP-24P board

• Preparation

• Input signal: built-in color-bar
• Connect the clip cord with CR between TP26 and TP1 on the extension board.

• chip cord with CR

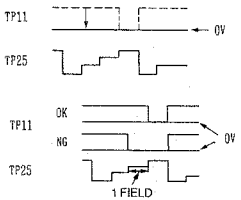


• Adjustment procedures

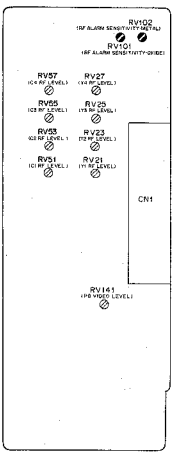
• Test point : TP11/Extension board:VP-24P
TP25/Extension board: VP-24P
• Adj. point : • OXIDE adjustment
● RV101(RF ALARM SENSITIVITY): OXIDE /VP-24P

• METAL adjustment
● RV102 (RF ALARM SENSITIVITY: METAL /VP-24P

• Spec. : Adjust so that the pulse waveform of the TP11 becomes 0V level point.



1. Insert the BCT-20K and put the unit into the REC mode. (OXIDE adjustment)
2. After OXIDE adjustment, insert the BCT-20M and put the unit into the REC mode. (METAL mode)
3. After adjustment is completed, remove the clip cord.
4. Confirm that the waveform of the TP11 is not fall to 0V in over 2 fields continuously. When NG, readjust the 1~3.



VP-24/P BOARD (COMPONENT SIDE)

8. VTR SYSTEM ALIGNMENT